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ARMY INFORMATION DIGEST

The Navy of the Future
Admiral Forrest P. Sherman

"For Want of a House--"

Stockpiling for Defense

Charting the Arctic

Cadets and Midshipmen Meet

Combat Role of Army Aviation

●

WHEN AN ATOM BOMB FALLS
Medical Aspects of Atomic Weapons

●

THE ARMY INFORMATION DIGEST

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U. S. Navy Photograph

ADMIRAL FORREST P. SHERMAN

CHIEF OF NAVAL OPERATIONS

THE NAVY OF THE FUTURE

By

ADMIRAL FORREST P. SHERMAN
Chief of Naval Operations

THE conclusion of nearly every war in our history has produced not only the same contraction in naval strength necessary to peacetime economy but also recurring gloomy prophecies that the Navy itself will become obsolete. Thus it was when we scrapped the 1816 program of sailing ships of the line. Thus it was when ironclads and torpedoes made our great Civil War fleet obsolete. When after World War I we scrapped not only our older battleships but also seven new battleships and four battle cruisers, it was claimed that the airplane had sounded the death-knell of surface warships. Earlier the same had been claimed for the submarine. Yet during World War II we had to build, man and take into battle greater fleets of surface ships and greater numbers of naval aircraft than the world had ever envisioned.

Today and tomorrow and as far ahead as we can see, the airplane and the submarine, and for that matter guided missiles and atomic energy, which have been claimed to mark the end of great navies, in fact will increase naval requirements and result not only in the survival of but also the further development of fighting ships. . . .

We must shape our future Navy in the light of the lessons of the past and the indications as to future needs. We must take into account the lessons of Hiroshima, Nagasaki, Bikini and Eniwetok. We must consider the implications of the revelation of Soviet developments in the field of atomic explosions. We must consider the significance of guided missiles and very-long-range bombing. . . .

We must remember that in two wars we and our allies have

From an address at the United States Naval Academy, 2 December 1949.

suffered heavy losses from enemy submarines and that much development has taken place in submarines and more is to be expected. We must make certain that every practicable means is exploited to make the Navy fully ready to defeat a third attempt to deny us by undersea warfare the use of the sea. At the same time we must be prepared to prevent aircraft from closing transoceanic lanes to our ships. Our naval countermeasures against both the submarine and the aircraft must include striking them at their bases as well as local defense against them.

While we should not adhere blindly to the weapons of the past, it is well to remember that although men thought that Jutland would be the last great sea battle, nearly thirty years later we had to fight the great battles of Midway, the Philippine Sea and Leyte Gulf. Men thought that the advent of aircraft, of coast defenses, machine guns and automatic weapons had made great amphibious operations impracticable. Yet this same generation lived to see the greatest amphibious operations in history. Despite every opposition, we moved great armies over long distances, landed them on hostile shores and supported them as long as support was needed. We must always move forward, but we must move sanely, grasping the strength of the future, holding the useful from the past.

Within a sound national economy there must be provided airborne and amphibious troops—soldiers and Marines. There must be an Air Force capable of defending our vital centers against attack, capable of striking our enemies at great distances and capable of effectively supporting the Army and the Navy. There must be a Navy strong enough to control the seas that separate us from our potential enemies.

Our country is fortunate in being in effect an island power. As long as we control the seas we cannot be attacked except by airborne weapons, and we can attack any target within reach of the aircraft and other weapons which we carry in our ships. We can establish and maintain our troops and land-based airpower in positions from which they can operate effectively.

The seas are cushions of distance which protect us against our enemies. They are also avenues through which we can project and support our joint military power. The seas enable us to apply relatively small forces and yet achieve superiority in critical areas of our own choosing, and to give visible and substantial support to our national interests and policies.

Ability to control the seas and the airways that cross the seas is essential to our security and to our struggle to prevent any hostile power from so dominating all of Europe, Asia and Africa as to menace our survival. Our national security requires that we maintain a balanced team of fighting services. You may be sure that the Navy is and will be a vital element in the fighting team—a vital necessity in our national life.

My belief in the future of the Navy is shared by everyone who objectively ponders the security of the United States. In his very recent but already important book, *Modern Arms and Free Men,* Dr. Vannevar Bush has this to say: "The mission of the Navy will be as important, and as difficult, as it ever has been in history. It will need to employ modern techniques to the utmost, and in ample quantity." And again, "The days of the Navy are not over, nor are its missions less essential. We are a power in the world and we intend to exert that power, if need be, far from our shores to support our friends and strike an enemy where he is the most vulnerable. . . . We shall still need to sweep enemy forces from the seas, whether they are under its surface or above it."

It is essentially the Navy's job in wartime to keep the conflict remote from our own shores and to deliver the Nation's fighting strength overseas. These are still our principal functions, although not an enemy surface vessel be on the high seas.

A self-contained military power, already in possession of the bulk of two continents and with the potential possibility to envelop and occupy the territory adjacent, has no need for extended lines of sea communications. Its naval problem differs radically from our own. Our business, in a war with such a power, would be to get at the enemy with speed and in strength, while at the same time keeping open the sea lanes upon which we depend. Our possible opponent, on the other hand, would seek to prevent us from transporting our military strength across the ocean and to cripple that strength by denying to the United States essential oversea trade.

For the foreseeable future, the fast carrier force will be the principal offensive striking element in our fleets—the core of their offensive power, available to strike far from our own bases and to cover and support the operations of other services. This force gives us the power to move wherever we choose against enemy shores while denying the enemy that same freedom of operation against us. This force is essential to all naval opera-

tions. The composition of our fast carrier force must, however, be so adjusted as to bring into balance the expenditures for procurement, maintenance and operations in the fields of personnel, ships and aircraft. This is a complex problem on which we are working.

Amphibious operations will continue to play an important part in the Navy of the future. Tactics and techniques will change and equipment will be improved. The availability of weapons of mass destruction such as an atomic bomb will exert a profound influence, but they will not change the fundamental necessity in war for moving men and materiel into oversea positions. They will not reduce the benefits that control of the sea brings in permitting selection of time and place of attack while forcing on the enemy overwhelming defensive commitments. We may expect a highly coordinated and highly flexible use of both airborne and amphibious elements. We must develop speed in preparation, speed in the movement to the objective and speed in getting troops and supplies ashore and

Department of Defense Photo

One of the Navy's newest hunter-killer destroyers, the *USS Carpenter*, is designed to hunt and kill high-speed, snorkel-type submarines.

dispersed. Heavy concentrations on the shore line will have to be avoided by speed and dispersal, by the use of separated attack points and by greater use of preliminary infiltrations.

The development of atomic bombs will actually increase the requirement for oversea operations and oversea bases and will therefore increase the need to maintain in the fleet an amphibious task force and to develop greater skill in its employment.

Besides the fast carrier and amphibious forces, you may expect to find in the fleets a third type—the antisubmarine force—in recognition of the seriousness of the submarine threat and our major responsibility for insuring the safe movement of men and supplies by sea.

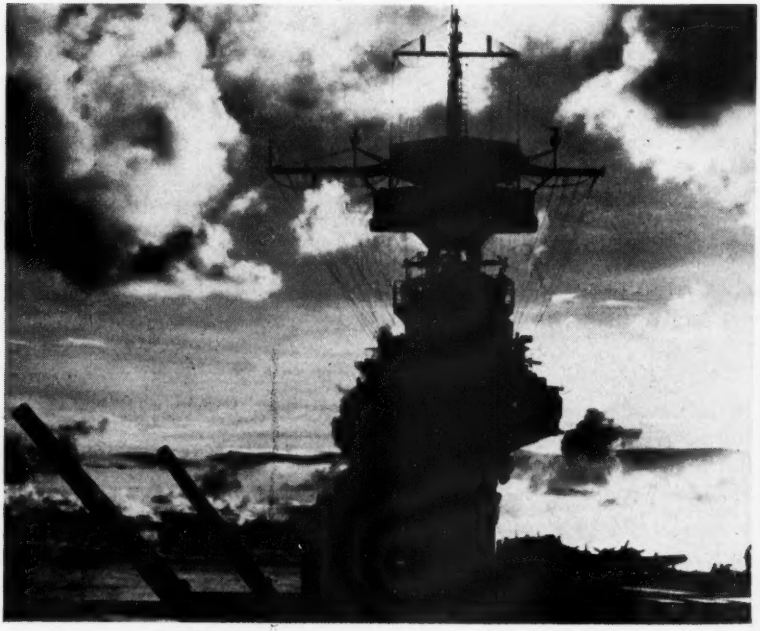
There actually exist in the world today two very powerful navies with opposite and therefore intensely conflicting missions. That we have aircraft carriers and the other naval power has none, that we have a large amphibious force and the other naval power has only a collection of small landing craft, are unacceptable arguments for diminution of American fleet strength. That the other power has a submarine force larger than ours is a potent argument for the United States to possess, not an equal number of submarines, but antisubmarine naval elements of great effectiveness. These must be so constituted as to permit attacking the submarine by every possible means—not only in our coastal waters and on the high seas, but in the enemy coastal waters and bases themselves. Our antisubmarine force may thus include fast carriers in conjunction with surface and submarine guided-missile ships for attacking bases. It might include special raider amphibious units for demolition of bases. It will require hunter-killer teams of submarines, surface ships and many types of airplanes and blimps. It will require powerful convoy escorts and coastal defense forces, especially against submarines firing guided missiles into our cities.

We do not today need to match an enemy naval force type for type because our probable function is not to resist invasion but to support military operations overseas. Tomorrow it may be different. Always we must clearly understand that the great necessity for a powerful peacetime Navy is the need to have it ready for war. It also has a continuing and a salutary function in the retardation—if not the prevention—of war. A strong Navy, by virtue of its mobility, is a potent factor in upholding United States foreign policy. Naval forces have

been truly defined as the precision tools of diplomacy. Unlike armies or airplanes, the Navy can traverse the globe without trespassing upon the sovereignty of any nation. As a decisive deterrent to piecemeal aggression, the United States Navy has amply justified its existence in the last two years alone. . . .

I sometimes regret that the entire American public is not as aware of the power for peace that our Navy exerts as are the people of Europe. The aircraft carriers, cruisers and destroyers which have operated in the Mediterranean during past years have been essential factors in the maintenance of peace and stability in the area. The Mediterranean peoples know and appreciate our naval strength. Many of our own people do not. . . .

The identical developments which superficial thinkers argue spell the Navy's obsolescence are the essential ingredients of the greater Navy of the future. Whether they be guided missiles, supersonic aviation of hitherto incredible ranges vertically and horizontally, noiseless high-speed submarines which never need to surface except for replenishment, or atomic missiles—they are all implements which the Navy now and in the future must be prepared to employ, and also combat.



"FOR WANT OF A HOUSE--"

By

LIEUTENANT GENERAL T. B. LARKIN

ONE of the most pressing postwar problems facing the Department of the Army has been the procurement of adequate family housing to meet the minimum needs of an Army expanded to several times its pre-war strength. Particularly acute is the shortage of on-post housing for married officers and noncommissioned officers who are entitled by law to quarters or allowances. The nation-wide housing shortage, moreover, aggravates the problem when military personnel are obliged to seek residences for their families in civilian communities already overcrowded.

Secretary of Defense Johnson in pointing to the critical need for military housing recently declared: "The military forces of the United States are composed of individuals who value, and are entitled to, the right and ability to live normal family lives. Circumstances peculiar to the type of organization in which they serve have tended to make difficult the attainment of this objective. With the relatively small amount of family housing existing at installations of the military Departments, by far the major hurdle has been to secure reasonably adequate housing, either Government-owned and assigned as public quarters, or at a rental which the individual family can afford to pay.

"Rather than be separated from their families because of lack of Government quarters and scarcity of adequate rental housing at their places of assignment," the Secretary added, "many of the service personnel have accepted disgraceful living conditions in shacks, trailer camps and overcrowded buildings, many at extortionate rents. It cannot be expected that competent individuals will long endure such conditions....

LIEUTENANT GENERAL T. B. LARKIN is Assistant Chief of Staff, G-4, Logistics.

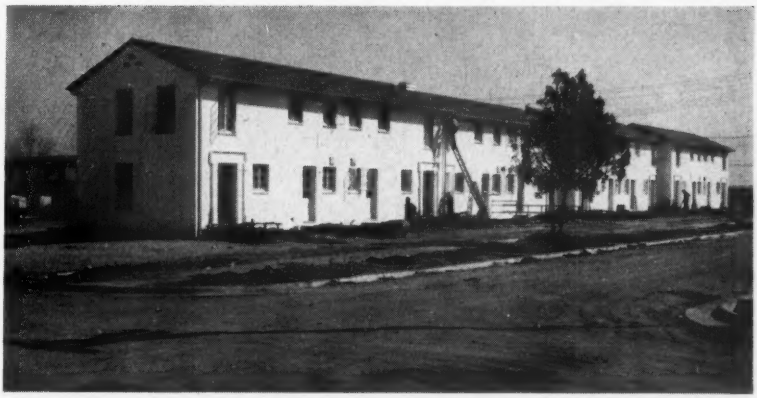
There is nothing more vital or pressing in the interest of morale and the security of America than proper housing for our Armed Forces."

During World War II these men accepted unwholesome living conditions as part of the exigencies of wartime service. Today, five years after V-E Day, the problem of providing them with places to live still remains to be solved. In many areas, because of the scarcity of rental dwellings to meet even civilian needs, married servicemen are paying exorbitant rents for sub-standard housing. Some travel many miles to and from work; others must be separated from their families; still others—some with a goodly number of years of service—decide that it is not worth the struggle and refuse to re-enlist. In justice to their families, they feel impelled to give up a job and a life which they have found to be worthwhile and thereby relinquish the foundations which they have laid for retirement. The Government at the same time loses skilled employees in whose training many thousands of dollars have been invested. These trained persons are essential to our defense program and their replacements are difficult to find.

Fortunately, however, forces at work are beginning to ameliorate the military housing shortage. The chugging of

AFIS Photograph

An architect's drawing of buildings for the 52-unit Stanwix Apartments at Carlisle Barracks, Pennsylvania. The project, being built at a cost of $335,000 under the Wherry Act, will be completed in mid-summer.



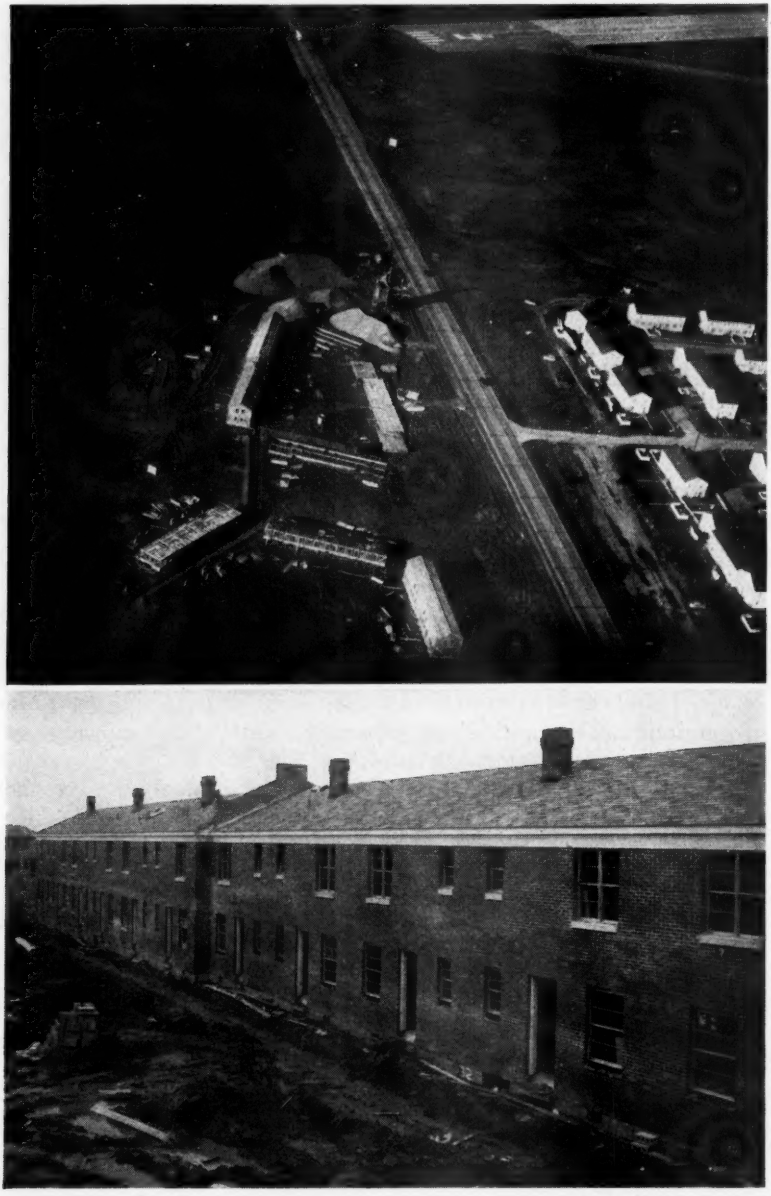
U. S. Army Photograph

Fort Benning families began moving into these quarters for noncommissioned officers in March. A total of $900,000 was appropriated by the Congress for the project which provides 80 sets of quarters.

bulldozers and the echoing of carpenters' hammers in or near Army installations herald an improvement in what has been, at best, a rather gray picture.

At the close of World War II the Army had approximately 13,000 sets of public quarters on its installations throughout the world. Expansion to the Army's present strength created a need for approximately 100,000 family housing units to accommodate those military personnel authorized quarters or allowances. Approximately another 30,000 units are required to house civilian specialists in the Army's employ. At the rate funds for military housing have been appropriated since World War II, it is estimated that 60 to 75 years would be required to provide all the necessary permanent quarters. Since 1946, funds have been provided by the Congress for the construction of 3000 permanent units, and somewhat less than 1000 more are projected in 1950. This construction furnishes only three and one-third per cent of the total needed by the Army alone.

As an interim measure designed to meet immediate needs, local commanders have sought solutions through a variety of expedients. In spite of the scarcity of funds, Army housing facilities have been virtually tripled by the acquisition of 13,000 temporary-type Federal Public Housing Administration units built during the war and 7647 temporary units converted from mobilization-type Army buildings. To this number may be added 1200 standard conversions which are planned in the



U. S. Army Photographs

An air view (top) of the Rose Terrace construction project across from Goldville, Fort Knox, Kentucky. One of the buildings (below) as it appeared in March.

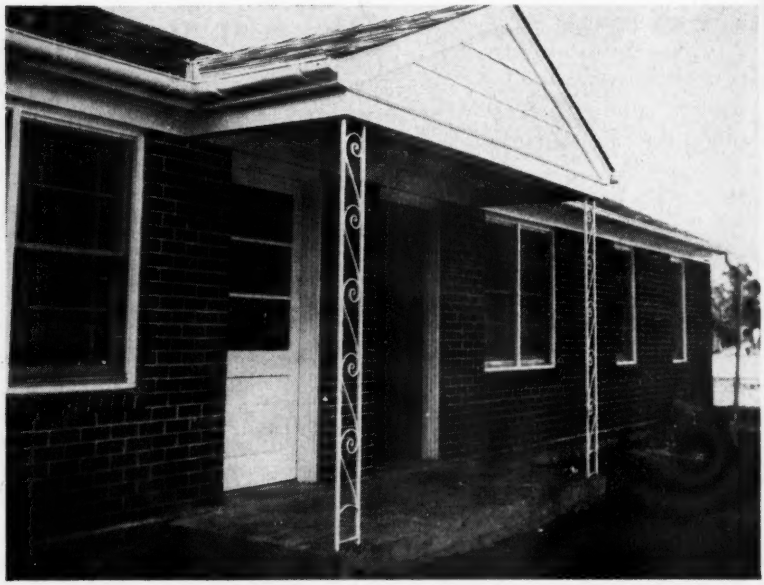
1950 program. Also, nearly 2000 families are living on an austerity basis in existing Government-owned buildings which have been equipped for occupancy only by the installation of cooking and toilet facilities and through improvements which the occupants themselves have made.

A number of other families are living in FPHA surplus house trailers acquired by the Army or in their own house trailers located in Army-built trailer parks. At best, these improvisations have provided but slight relief in numbers and these makeshift arrangements are far from adequate.

In some instances Army personnel have taken the initiative in meeting their own housing requirements. One notable example is that of Fort Bliss, Texas, where 211 four-room, prefabricated units were built by enlisted personnel for their own use. Each prospective tenant put up an initial deposit of $300 for materials and contributed his labor as well. The Army Emergency Relief and private enterprise assisted in financing the cooperative undertaking. The two-bedroom, 20x30-foot Fort Bliss homes were completed at an approximate cash cost of $1600 each, plus utilities, and all are now occupied.

Recent legislation has helped to bring a measure of relief to the military housing field. Public Law 211, commonly known as the Wherry Act, was enacted in August 1949 as an amendment to the National Housing Act. The law is designed to encourage the construction of family housing by private enterprise for use by military personnel and civilian employees of the armed services. It establishes a program of Federal Housing Administration mortgage insurance whereby the Government assumes a contingent liability for the major portion of the investment risk involved in such construction. The Secretaries of the Army, Navy and Air Force may lease or sell real property under their jurisdiction in carrying out the terms of the Act. The Secretary of Defense, or his designee, must certify to the Federal Housing Administration that the housing for which mortgages will be insured is necessary to provide adequate housing for Armed Forces military and civilian personnel, that such installation is deemed to be a permanent part of the military establishment, and that there is no present intention substantially to curtail activities at such station.

Private enterprise, in cooperation with the FHA, has responded encouragingly to this Act. As of 1 March 1950 a



U. S. Army Photograph

An apartment in the 200-unit Battle Park project on the main post, Fort Benning. The development will house officers in the advanced class of the Infantry School and some company grade officers. Rents are $70 and $80.

total of 11,590 Wherry-type units have been approved by the Army, and a fairly large number of these are expected to be completed during 1950. The initial Army program under the Act will provide approximately 15,000 units. Additional units will be authorized if experience with initial projects at any installation indicates that the construction of such units would be feasible under the Act. Unless renewed, the Act is due to expire on 30 June 1951.

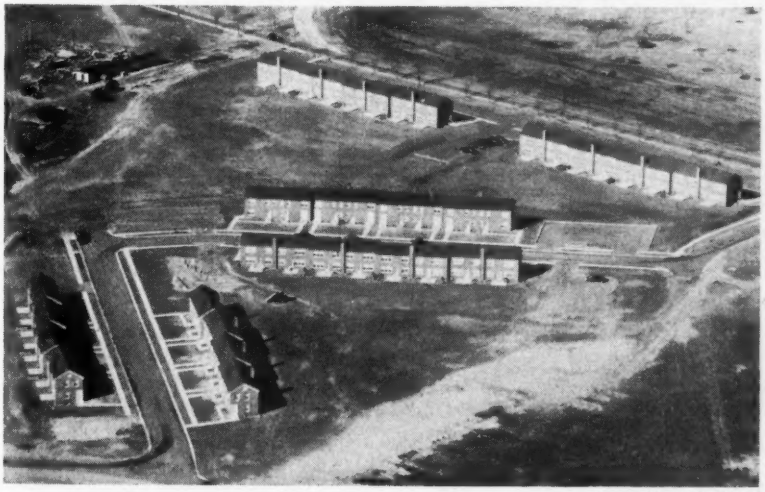
Typifying Wherry housing now under construction are projects at Carlisle Barracks, Pennsylvania, and Fort Knox, Kentucky. At the former installation, 52 units, costing approximately $335,000 and financed by a locally organized corporation of businessmen, are scheduled for completion in midsummer of 1950. At Fort Knox, a 1000-unit project financed by a group of Louisville businessmen will be finished in 1950 at a cost of more than $9,000,000. Both projects contain one-, two- and three-bedroom apartments in two-story brick buildings.

Even though substantial headway has been made under the Act, it has its limitations. The number of units that can be

built is limited in part by the number of personnel able to pay the rentals. In many areas the prevailing cost of construction is such that rentals must be higher than many junior officers and noncommissioned officers can pay. Nevertheless, it is expected that the new housing gained under this program will benefit junior and noncommissioned officers by freeing more public quarters for them to occupy.

To make quarters available to the junior officers and the noncommissioned officers at rentals more within their means, the Department of Defense is preparing additional legislation to overcome some of the inequities pointed up by Public Law 211. Under the new plan the services would acquire housing projects on long-term leases at a cost not to exceed 65 per cent of the total of rental allowances which would be saved by assigning military personnel to the project. The remaining 35 per cent of allowances thus saved would go into maintenance and operating costs. By this method the Government will have additional living accommodations for military personnel at a cost no greater than the prescribed monetary allowances in lieu of quarters. These quarters would be assigned and administered as are other public quarters.

This proposed legislation would correct one weakness of the Wherry Act under which a rental commensurate with the value of the accommodation must be charged for each unit.



U. S. Army Photograph

An aerial view of an on-post housing project at Fort Meade, Maryland, completed in December 1949.

U. S. Army Photographs

Construction on Meade Heights, a $3,132,000 Wherry Act rental housing project adjacent to Fort Meade, Maryland, as seen from the air. The project, consisting of 324 garden-type apartments, 24 semi-detached, three-bedroom houses, 30 brick garages and a shopping center, is shown in the ground view below. Rentals will range from $61.50 to $105.

This rental often is more than the $67.50 quarters allowance received by enlisted personnel of the top three grades. Under the new plan financing charges would be materially less than they are for Wherry projects and, therefore, additional numbers of units could be provided for all grades.

Family quarters which are being acquired under the Wherry Act or which may be built under the provisions of planned legislation will supplement the Army's own program of construction. Authorizing legislation now before the Congress would provide 2833 housing units for the Army—both in the United States and at oversea installations.

In an effort to gain greater uniformity in the procurement of Armed Forces housing, the Secretary of Defense established the Department of Defense Housing Commission in November 1949. The Commission, comprised of outstanding leaders in the fields of real estate and finance, with Bertram E. Giesecke, architectural engineering expert from Austin, Texas, as Chairman, has been requested to study the military housing problem. As part of its wide-ranging study the Commission has been asked to review current laws governing the provision of family housing at Government expense. It will examine standards for family housing, to include sizes, materials, designs and types. It will review the rules, procedures and practices of the Department of Defense relating to family housing and the policies governing charges for housing, including the adequacy of quarters for which full rental allowances are now withheld. It will seek to determine the extent to which appropriated funds are required and the extent to which other means may be employed. The Commission also will study means of providing suitable quarters for limited periods of time.

The Department of Defense Housing Commission is now engaged in the extensive task of finding the answers to these and other problems. It is hoped that out of its findings and recommendations will develop an integrated Department of Defense housing program.

After currently authorized construction has been completed, there still will be a deficiency of 79,000 units in the Army. Nevertheless, when it is realized that in 1940 there were only 13,000 units available to the Army and the current requirement of 130,000 units—a ten-fold increase—is moving toward realization, it is apparent that definite progress is finally being made toward correcting the Army's housing problem.

WHEN AN A-BOMB FALLS

As an aid to civil defense planners in state and local governments, the National Security Resources Board—the agency charged with coordinating civil defense planning—recently called upon the Department of Defense and the Atomic Energy Commission to prepare a series of reports on defense against atomic explosions. Bringing together the findings of experts in various fields, The Medical Aspects of Atomic Weapons *assesses the effects of an atomic explosion upon people within its range, the medical and biological aspects of radiation injuries and their treatment. The full 24-page report is obtainable from the U. S. Government Printing Office, Washington 25, D. C., at ten cents a copy.*

A SINGLE atomic bomb of the type dropped on Nagasaki and Hiroshima during World War II can lay waste the heart of a large city and injure and kill great numbers of people. In the two Japanese cities, more than 100,000 were killed, and nearly as many were injured. . . . In both attacks an atomic bomb, considered as roughly equivalent in effect to setting off 20,000 tons of TNT, was exploded at a height of about 2000 feet above the earth on a clear day. That was approximately the altitude at which a bomb of such power is estimated to have the greatest effect.

The Hiroshima and Nagasaki bombs caused death and injury to people and serious damage to buildings for two miles from the point at which the bomb was set off. The extreme limit of damage was about four miles. . . .

A high air burst, such as that in Japan, leaves no dangerous amounts of radioactivity on the ground. A bomb exploded in the air at low altitude—as in the Alamogordo test—will pulverize and vaporize materials in its immediate vicinity. It will not affect as wide an area and the screening effect of hills will be increased since the explosion takes place closer to the earth. Radioactive contamination will, however, be severe within a limited area.

An underwater explosion of an atomic bomb also might cause serious contamination. At Bikini, the underwater (Baker) test caused what is known as a base surge—a 200- to 300-foot "wave" of heavy radioactive mist which spread outward from the base of the mushroom tower of water, turned into a low-lying rain cloud and precipitated radioactive materials over the surrounding area. If the explosion of a bomb caused such a base surge, contamination of any adjacent

land areas would result. Other types of injuries from the explosion itself, however, would be reduced.

The effects of the burst of an atomic bomb upon people are essentially the same as those caused by an amount of TNT that releases an equivalent total of energy, but with certain added factors. Injuries suffered in the collapse of buildings will predominate in both cases. The main differences are, first, the greater amount of radiant heat released by an atomic explosion; second, the large amounts of light, including ultra-violet; and, third, the large amounts of nuclear radiation.

Injuries to people from an atomic bomb can be divided into four general categories—those caused by the blast pressure wave directly; those caused when buildings are wrecked; those caused by burns either in the wreckage or from radiant heat; and those caused by nuclear radiation, either directly or through residual contamination.

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A high air burst on a clear day probably would produce no dangerous contamination at all on the surface of the earth—it did not in Japan—and people could enter the area even directly under the point where the bomb exploded immediately afterward without danger from this source. . . . . A burst close to the surface, or under water, would increase the amount of contaminated material. When a base surge occurred, heavy contamination might be expected.

★

In the case of such a high air blast as in Japan, some 15 to 20 per cent of the deaths probably would be caused solely by nuclear radiation. The remaining 80 to 85 per cent would be caused primarily by injuries suffered in the collapse of buildings and by burns, although many of these would also suffer severe radiation exposure.

Direct injury from radiant heat occurs at the explosion of the bomb. Japanese people in the open suffered third-degree burns up to 1500 yards and second-degree burns up to 2500 yards. The effect was instantaneous. Nuclear radiation continued in dangerous quantities for 60 seconds but most of it was concentrated in the first few seconds, 50 per cent occurring in the first second. People in the immediate vicinity suffered injuries from nuclear radiation, but beyond a mile and a quarter injuries fell off sharply.

Direct blast injury may occur wherever the air comes into contact with body surfaces—particularly the intestinal tract,

the stomach, the lungs, the ears and the sinuses about the nose. Greatly increased pressure, especially if the increase is sudden, can tear these tissues. Few injuries of this sort were reported in Japan among survivors.

In the water the dangerous level for pressure is about 500 pounds per square inch. In an underwater atomic explosion, any person immersed in the water probably would be killed or seriously injured within a distance of 2000 yards from the zero point.

★★★★★

Gamma radiation cannot be turned aside by such simple measures as protective clothing, but dense material, such as concrete, can reduce its ionizing effect. Three inches of concrete will cut the amounts of gamma radiation by half, and the customary nine-inch concrete wall used in construction would reduce gamma rays to one-eighth their original potency. However, even at distances of 1000 yards from the ground point of explosion, 21 inches of concrete would be necessary to cut down gamma rays enough to prevent serious radiation injury. . . . The best protection against contamination is to use instruments to detect its presence and to avoid any dangerous concentration.

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Secondary blast injuries are an important cause of death in an atomic bomb explosion. Since practically all brick and light masonry buildings with weight-bearing walls in the blast area will be wrecked, wooden buildings flattened, and the doors and other partitions of blast-resistant steel-reinforced concrete buildings blown out, people in or near these buildings will be killed or injured by collapse of structures and by missile effects of debris. . . .

Severe burns were caused both by the radiant heat from the explosion of the atomic bomb (flash burns) and from the fires that broke out in the wreckage (flame burns). . . . Atomic bomb flash burns are sharp in outline and are oriented to the point of the explosion. Shadow effects are prominent. An ear, for example, might be badly burned yet the skin behind the ear be unharmed.

Even loose clothing afforded some protection against atomic flash burns and color also had a protective effect. White clothing tended to reflect the radiant heat, darker clothing to absorb heat. Burns sometimes were cross-hatched where light clothing was marked with dark lines. Tight clothing was less protection and burns were inflicted at elbows and

where straps crossed the shoulders, while other places where clothing was loose were protected or less severely burned. . . .

A conflagration may be expected to follow any atomic bomb blast. Not only is the radiant heat sufficient to ignite wood and lighter materials, but the collapse of structures overturns stoves and furnaces, breaks electric wires and ruptures gas lines. About 70 per cent of Hiroshima's fire fighting equipment was destroyed, firemen were killed, the water supply disrupted and streets were clogged with debris.

The uprush of the atomic cloud after the explosion causes an inrush of wind, and heat from fires augments this effect. At Hiroshima a "fire storm" resulted with gale-winds sucked inward toward the center by the continued uprush of hot air. This did not occur at Nagasaki but must be assumed as a danger in an atomic blast. At the very least, fires about the perimeter will tend to consolidate and cut off help from people trapped within the blast area. . . .

★★★★★

Adequate care to injuries and burns suffered in an atomic explosion presents a problem of great magnitude. . . . It would be unrealistic to prepare for fewer than 40,000 to 50,000 severely burned persons from a single atomic explosion. Ideal care of a severely burned patient, according to one such case, would include provision for 42 tanks of oxygen, 3 nurses, 2.7 miles of gauze, 36 pints of plasma, 40 pints of whole blood, and 100 pints of other fluids plus drugs such as morphine and the antibiotics. Obviously such ideal treatment would be impossible under catastrophe conditions.

★

Physicians find that the severity of radiation symptoms is related importantly to two factors: the amount of radiation absorbed in a single dose and the proportion of the body exposed. . . .Patients who survive enter a convalescence during which a feeling of weakness and fatigue is the outstanding symptom. It may be months before the patients recover normal strength and weight. The skin hemorrhages disappear and the hair, if lost, gradually regrows. Usually within six months the patient feels completely well. All usual methods of examination indicate that, by this time, the patient is normal. Nevertheless, it is too soon to say that survivors will not suffer further ill effects.

The acute radiation illness includes damage that can be detected only by laboratory tests—changes in blood cells, in male sex organs, and in the functioning of other organs,

Infections and ulcerations arise because radiation destroys white blood cells that normally aid in combating bacteria. A few days after radiation exposure, the number of white cells declines and in severe cases the cells disappear almost entirely. The decline in the number of red cells causes anemia and contributes to the general weakness and debility so marked in acute radiation illness. . . . There are two possible after-effects from radiation exposure that cannot be fully assessed for many years—effects on heredity and effects on fertility. . . .

★★★★★

Many people believe that very little can be done in treatment of radiation casualties. This is true in case of a lethal dose; but certainly it is not true when the exposure is in the median lethal range. Many borderline cases can be saved by: good medical and nursing care; whole blood transfusions, given as may be required in the individual case until the bone marrow has had time to regenerate and produce blood; control of infection by antibiotics such as penicillin; intravenous feeding to supply necessary sugars, proteins and vitamins; and control of the bleeding tendency by use of drugs.

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In the treatment of radiation casualties, whole blood would be required in great quantities, primarily to treat those suffering from mechanical injuries and burns, secondarily to treat victims of ionizing radiation. It has been estimated that for a catastrophe such as at Hiroshima approximately 250,000 pints of blood would be needed, 80,000 a week for the first three weeks. Subsequent to this, there would be only a nominal requirement for whole blood. This time relationship favors the possibility of obtaining blood from donors, processing it, and transporting it to the operations area, as is envisaged in the blood program of the American Red Cross. The time factor would likewise permit evacuation of victims to unbombed areas where better nursing care, so essential to recovery, could be better provided. . . .

Under certain conditions radiological contamination could become a dangerous after-effect of the explosion. Residual radioactivity can be detected and measured by trained teams using Geiger counters and similar devices, and their measurements would determine when and for how long it would be safe to enter a contaminated area. . . .

Radioactive materials can enter the body through the mouth, through breathing or through a wound. They are particularly destructive when retained in the body for some time,

Much concern has been expressed regarding the contamination of drinking water. In a high air burst on a clear day, the fall of radioactive materials is so small that dilution by water probably insures safety. The efficiency of the filtration plants and the distance of sources of supply from cities are further safety factors. . . . At Bikini, sea water from a heavily contaminated source was distilled (that is, turned into steam and condensed, not merely boiled) and found safe for drinking purposes.

As to the hazard of inhaling particles of matter, the size of the particle is important. The nose filters out almost all particles larger than 10 microns in size (one-inch equals 25,000 microns). It will filter out 95 per cent of all particles over 5 microns in size.

At a bomb burst, contaminated particles—the largest only one five-hundred thousandth of an inch in diameter—ascend rapidly into the atmosphere. If they settle, as on a rainy day, they usually attach themselves immediately to larger particles. The chances of inhaling a dangerous amount of these small particles are slight. A combat-type gas mask will filter out 99.999 per cent of all such particles.

If someone is wounded while in a contaminated area such a wound should be cared for in the same manner as any similar injury in an uncontaminated area. Cleansing with soap and water and cutting out of damaged tissue is particularly important. The wound should then be closed. Amputation is not indicated.

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In the course of a medical study of a disease of the stomach or intestines, a patient may be exposed to some 40 roentgens in undergoing a series of X-ray examinations. X-rays of the teeth may subject the patient to about two roentgens. In such cases, a person may be subjected to a one-time exposure of many times the daily "maximum permissible dose" without suffering injury.

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Filter-masks, clothing tight at the wrists, ankles and neck, and tight-wristed gloves will afford protection against contamination. Material heavily contaminated should not, however, be handled even with gloved hands since it can cause severe burns. Tongs or equivalent instruments should be used. Clothing should be discarded at the edge of the contaminated area to avoid spreading radioactive contamination. Thorough

soap-and-water bathing would be a valuable precaution. Bodies that have been exposed to radiation can be safely handled.

What is a dangerous concentration of ionizing radiation? . . . In the atomic energy program a standard has been set—called the maximum permissible dose—which stipulates an exposure that experts believe a man could experience every day in his life without danger of injury. This has been fixed at a maximum of one-tenth of a roentgen* a day with a weekly maximum of three-tenths of a roentgen. But this standard applies to *daily* exposure—a very different matter from a one-time exposure in emergency.

In emergency operations a person could probably be exposed to 50 roentgens of total body radiation without incurring injury and be able to continue at his duties. A person exposed to 100 roentgens might have some nausea and changes in the number of blood cells but most likely would be able to continue at his normal duties. Those exposed to 200 roentgens probably would become incapacitated after the injuries began to take effect—probably a matter of some hours. In rare cases, as stated earlier, 200 roentgens might ultimately cause death.

While acute exposures of 200 roentgens and more will result from atomic bomb explosions, radiation of this degree will rarely result from residual contamination deposited by a bomb. The rate of exposure is of considerable importance. A person who receives 600 roentgens in a single exposure within a period of a few minutes will have small chance of survival, but if a man received only 30 roentgens a day it probably would take a total of as much as 1800 roentgens to prove fatal.

The medical aspects of atomic bomb explosions indicate clearly that a major task for medical authorities will be the care of blast and burn injuries; that a main problem will be caring for patients in numbers that would swamp the normally available facilities, even in the improbable circumstances that facilities were not appreciably damaged. Dispersion of facilities thus becomes important as does organization of emergency work over wide areas, so that outside help can come to the rescue of bombed areas and so that patients who can be moved can be evacuated to places where they can receive better care.

* The roentgen is a measurement of the ionizing effect of radiation, indicating the amount of X-rays or gamma-rays required to produce ions equivalent to one electrostatic unit of charge in one cubic centimeter of air under standard conditions.

CADETS AND MIDSHIPMEN MEET

FOSTERING a spirit of unification among potential officers, the United States Military Academy and the United States Naval Academy are conducting a series of academic exchange visits by members of the Second Class (juniors) of each school. With the mingling of blues and grays in the Central Area at West Point and in the Rotunda of Bancroft Hall, the groundwork is being laid for greater coordination and cooperation among Army and Navy leaders of the future.

Grouped in six exchange parties, Midshipmen of the Second Class spend three days at West Point each academic year and six parties of Cadets visit Annapolis for a like period. During their visits the Second Classmen are oriented in the history, development and curriculum of the sister Academy. They tour points of interest, attend inspections, receive sample instruction and participate in social life, meanwhile developing a well-rounded appreciation of their service contemporaries.

After a recent visit a Cadet and a Midshipman recorded the observations appearing in the following pages.

U. S. Navy Photograph

The Army joins the Navy on the way to chapel at Annapolis.

A CADET AT ANNAPOLIS

By

CADET MAYNARD B. JOHNSON

THE "Welcome aboard, Cadets!" with which we were greeted, combined with the procedure of getting acquainted over cupcakes and coffee, conformed to the ritual of Navy protocol. Old friendships were quickly renewed and new ones made. In this spirit of comradeship we received our initiation to the United States Naval Academy—the "Citadel on the Severn."

The immensity of Bancroft Hall was striking. The high-arched ceilings, smoothly polished marble columns and the numerous corridors converging at its center emphasized its size and beauty. Here, in what is claimed to be the largest dormitory in the world, the Midshipmen live in convenient and spacious quarters. As a Cadet, I took particular note of the comfortable beds, the varied room arrangements and the showers. Alcoves in some of the rooms made them large enough to house four men. Lockers and desks were modern, highly polished and clean. Apparently the Navy's traditional "everything shipshape" is carried out ashore as well.

Reveille was conducted with marked simplicity. Although the Middies performed their early rising routine with somewhat less vigor and alacrity than is the custom at the Point, the same purpose was accomplished. Before breakfast formation, the report "All out, Sir" was made and beds torn apart.

Meal formations, like reveille, are held in Bancroft Hall. Preceded by a reverent blessing and the command "Seats," a tasty meal is served by courteous waiters. Reinforced by a hearty breakfast, the Middies march in class formation past the famed statue of Tecumseh to the other end of Stribling Walk, where the three buildings of the academic group are located—Sampson Hall, housing the department of electrical engineering; Mahan Hall, containing the library and auditorium; and Maury Hall, with its classrooms devoted to military history, English and government.

Class recitations are relatively the same as those conducted at West Point. Classes consist of some fourteen men each and recitations are given individually at the blackboards. One noticeable difference, however, is the greater number of civilian

instructors employed at the Naval Academy. Courses cover approximately the same subject matter as an engineering college, with less emphasis on social sciences and humanities than prevails at the Point. Classroom informality is more nearly that of a college than of a military school.

On Saturday morning the Cadets gathered at the dock and were taken across the Severn to the Naval Engineering Experiment Station. The tour through the laboratories where the latest developments in marine research are conducted was interesting indeed.

The Midshipmen of the First Class invited the Naval hosts and their Cadet guests to attend the Saturday night hop in Memorial Hall. This spacious hall, decked with trophies and pictures of historic naval battles, provided a comfortable setting. Soft lighting and carefully prepared refreshments added to the graciousness of the affair.

Midshipmen, I particularly noted, are permitted to leave the reservation up to the five-mile limit, which includes the picturesque town of Annapolis. Here with their dates, who are quartered at Carvel Hall, they may find entertainment and amusement. Although Midshipmen may not ride in automobiles as do Cadets at the Point, the Academy grounds are compact and everything is within easy walking distance.

Chapel services early Sunday morning were most impressive, replete with military precision and display. With freshly polished shoes and caps properly squared, the Midshipmen formed in the courtyard of Bancroft Hall and marched to chapel. The 80 sets of Cadet grays among the 800 blues symbolized the coordination of the services in the common cause. The large domed chapel with its religious escrolls along the sides provided a setting of spirit and reverence proper to a place of worship. After chapel Middies and Cadets exchanged sincere goodbyes, thank yous and hearty promises to "see you later."

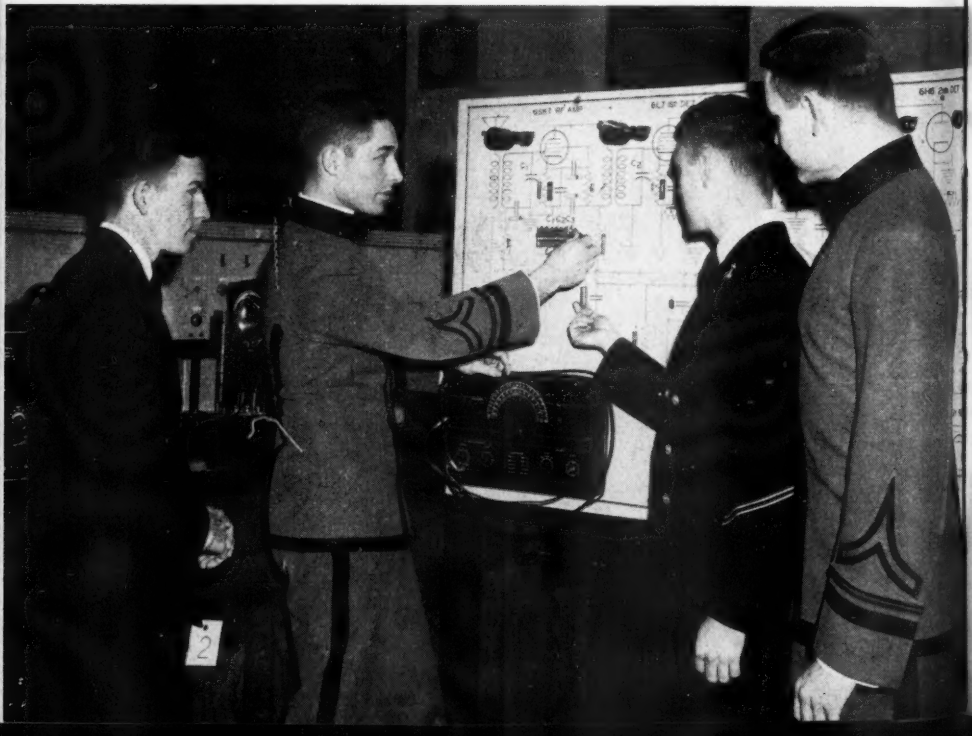
As we traveled back to West Point, the phrases of the welcome message kept coming back to mind: "The Brigade of Midshipmen sincerely welcomes you. We hope you will enjoy your visit to the Naval Academy, that it will be instrumental in cementing more fully the feeling of good will and fellowship which has ever existed between the two Academies and which results in many lasting friendships." Now, in retrospect, those phrases are filled with new meaning and significance.

U. S. Navy Photo

COMPARING NOTES IN CLASS AND LABORATORY

A Cadet observes how a problem in navigation is solved by a Midshipman at Annapolis, above, while (below) two Cadets play host to Midshipmen in a laboratory of the Department of Electricity at West Point.

U. S. Army Photograph



WEEK-END AT WEST POINT

By

MIDSHIPMAN WILLIAM F. LEPPIN

AT the gates of the Military Academy our group was met by a welcome party in an Army jeep. Word of our arrival was radioed ahead, and we were escorted to Grant Hall. Here at a reception, I was introduced to my host—the Cadet who was to be my guide and roommate during our stay. As fellow residents of the Cadet dormitory and more participants than guests, we became, figuratively speaking, part of the Army for two and one-half days.

Almost immediately we launched into discussions of our respective Academies. Methods and experiences were discussed and compared. We talked of the exchange program, our mutual acquaintances, the details of Academy life. The only difference between us, we concluded, was our clothes.

Reveille the next morning was quite different from that at the Naval Academy, where one merely reports "turned out" to the reveille inspector. At the Point the announcement "Five minutes to assembly for reveille" is made, and four minutes and fifty seconds later, regardless of the weather, muster is held outside—sharply at six o'clock. Muster was not prolonged and seemed completed almost before it began.

Breakfast formation followed the same procedure, with absentees reported by the squad leaders to the platoon leaders. The appetizing meal that followed was another revealing experience. In the vast dining hall, small tables—about half the size of those at Annapolis—imparted a pleasant touch.

After messages of indoctrination and official welcome by representatives of the Superintendent and the Second Class Cadets, we toured the museum, library, gymnasium, Trophy Point and other major places of interest.

The several classes we attended were conducted in much the same manner as those at the Naval Academy. One notable exception was the Tactics Course, corresponding to Naval Leadership, which was presented by the lecture method. At Annapolis the informal classroom discussion method is customarily used.

Later, with our Cadet hosts at the wheel, we were driven in trucks to the site of the 1802d Special Regiment. There we witnessed a demonstration of infantry, artillery and armored

cavalry equipment and facilities used in Cadet training. In a representative artillery problem a Navy spotter directed both naval and shore batteries, illustrating the coordination of both teams.

The special Saturday afternoon review put on by the Cadets for the Midshipmen was particularly well executed and impressive. The Cadets were inspected by Commander Fletcher Hale, a Navy officer on the Military Academy staff. This was another graphic example of unification seen at first hand.

Socially, facilities at West Point are a considerable improvement over those at Annapolis. When a Cadet signs out after inspection he is free until 0100 Sunday morning, to dine, dance or see a show. There is a hotel on the reservation where his date may be accommodated, and there is no restriction against his joining her there for dinner. Midshipmen, on the other hand, are required to attend evening meal formation before dining out with their girls in town.

Sunday morning, the Midshipmen escorted their hosts to the famous chapel overlooking the Hudson. The brief but impressive service in this hallowed setting was unforgettable.

Certainly the purpose of our visit was fully realized. Abiding friendships and mutual respect among men who will be contemporaries in the service after graduation were planted securely. Along the Severn and the Hudson, the Classes of 1951 had struck roots of understanding that will long endure.

U. S. Army Photograph

Midshipmen examine an M-1 rifle in their host's barracks room at West Point.

ARMY EXTENSION COURSE SCHOOLING

By

LIEUTENANT COLONEL OLIVER B. COMBS

"IT is essential to our national defense that the training of our National Guard and Organized Reserve Corps personnel be carefully planned and supervised, utilizing every available means to the best advantage. Every man needs military schooling in order to perform efficiently the duties of his assignment in the Army structure. But the time required by civilian pursuits and the expense involved will not permit everyone in the reserve components to take resident courses in Army schools, so we endeavor to bring the expert tutelage of our schools to them. One of our best means is through a comprehensive extension school program. That form of military training is a valuable adjunct to the weekly drill periods and summer field training."

In speaking thus, General Mark W. Clark expresses not only personal conviction but professional duty. His responsibilities as Chief, Army Field Forces, include the development of a sound program to provide continuing military educational opportunities for members of the reserve components. The Regular Army officer pursues a carefully charted course leading him progressively through the various levels of Army schooling. Probably one-fifth of his career—roughly five or six years—is spent as a student in various service schools preparing himself for more advanced assignments and for greater and more complex responsibilities.

No such program can be undertaken by the average Reservist or Guardsman whose military aspirations must, of necessity, be adjusted to the demands of his civilian life. Yet the value and efficiency of civilian components in a national defense emergency will depend, in large measure, on the opportunities

LIEUTENANT COLONEL OLIVER B. COMBS, FA, was formerly in charge of the Extension Course Branch, G-3, Office, Chief, Army Field Forces.

afforded their members to advance themselves professionally and to keep themselves informed of new equipment, new techniques and new concepts of warfare.

Army Extension Courses have proved to be the solution—a solution based on an effective, skilled program of instruction and supervised study, paced to the individual reservist's ability, interest and available time. In his own home or in the quiet of his office after business hours, he studies selected subjects prepared at the same schools and by the same faculties which instruct Regular Army resident students. But these courses offer more than instruction. Successfully pursued, they earn credits toward maintenance of active duty eligibility, toward promotion and ultimately toward retirement benefits. To the enlisted Reservist or Guardsman they provide the first step toward a commission.

The idea is not new. Extension courses were instituted long before World War II and were used by a sufficiently large number of officers long enough to prove their worth. Many a young officer who moved ahead rapidly when called to active duty laid his foundation for more advanced training and for more capable combat leadership by effective use of extension courses.

With the conclusion of World War II and the reorganization of the National Guard and the Organized Reserve Corps, an exhaustive study of the entire extension course program was made by the Office, Chief, Army Field Forces. Courses have been rewritten and brought up to date; procedures which previously had not proved satisfactory have been revised; methods of grading have been standardized and put on a more equitable basis; and, except for the Basic Military Instruction Course, all lesson material preparation, correction and grading of papers, and administrative details are centralized at the service school of each branch.

Authority for the extension course system and details of its operation are to be found in AR 350-300, SR 350-300-1 and Department of the Army pamphlet 20-100. The Special Regulation provides for six series of courses in each branch, each series adapted to the experience and instructional level of students for whom it is prescribed.

Credits for the different series are approximately proportional to the time in grade required for promotion. The exact credit granted for each series is determined by the student's proficiency in the lessons of the course. Three hours of credit earn one point toward active-duty eligibility and retirement.

The regulation stipulates credit hours to be allowed for completion of courses as follows:

Series	*Designed For*	*Credits*
10	Basic Military Instruction	200 to 250 hours
20	Second Lieutenants	150 to 280 hours
30	First Lieutenants	230 to 250 hours
40	Captains	370 to 400 hours
50	Majors	230 to 250 hours
60	Lieutenant Colonels	310 to 330 hours

Application for enrollment is made by the individual through his unit commander and unit instructor to his branch school or, if he belongs to a branch which has no school, to the Adjutant General's School at Camp Lee, Virginia. In processing the application, primary consideration is given to the qualifications of the individual for the course he desires to take and the future value of that particular course to him and to the service.

If he is a warrant officer or enlisted man preparing to be examined for a commission, or if he is a young officer desiring to refresh his previous study, he starts with the 10 series—Basic Military Instruction. Otherwise he will take the courses prescribed for his grade and branch or, under certain conditions, he may take an appropriate course of another branch. Because of the fundamental nature of the 10 series, some Chiefs of Administrative and Technical Services require their specialists to take this series or appropriate parts of it within two years after being commissioned.

Once the application is approved by the school, lesson assignment sheets together with necessary texts or instructional material are sent to the student. Each lesson requires two to four hours of work. Courses are planned on the assumption that the average student will complete one lesson a week. Most problems are of the multiple-choice type since these are considered more objective than those requiring a narrative type solution. Also they save time for the student and permit fairer and more accurate grading by the instructor.

As he completes each lesson the student forwards it to the school where it is graded and the grade entered on the student's record. A grade of 75 per cent or better is considered satisfactory. If the student fails to secure a satisfactory grade, an unsatisfactory rating may be recorded or the instructor may require that the lesson be repeated before fur-

ther assignments are made. But the instructor does more than grade the paper. He points out in marginal notes or in more extensive memoranda what is wrong, why it is wrong, what the correct solution is and why it is correct. When the lesson sheet is returned to the student he is able to profit from the mistakes he has made by receiving a clear and constructive explanation.

Each series is composed of several subcourses of three to nine lessons, each concluding with a review or examination lesson. Successful completion of the series requires satisfactory grades in each subcourse. After a student has completed the required series for his own grade and branch, he may apply for the same series in another branch, thus broadening his basic knowledge and at the same time acquiring a sounder conception of the interrelationship among various arms and services. Or he may enroll for a course in a school other than that of his own branch if his current or prospective duties require such training. But this must come after he has completed the training for his grade in his own branch.

For training of any kind to be of value to the individual and to the Army, certain basic requirements must be met. Seriousness of purpose is essential. Successful completion of at least 15 credit hours of courses or subcourses within a six-month period is required. Failure to meet this requirement will cancel a student's enrollment in a course and may affect adversely future applications for enrollment. Mental ability to absorb the instruction and sufficient military training and background upon which to base more advanced training are likewise essential.

Today, less than five years after the cessation of hostilities and the reorganization of the reserve components, more than 100,000 individuals are enrolled in extension courses—a number only slightly less than the pre-war maximum of 110,000 reached in 1940. From this 100,000 and from new applicants constantly being enrolled will come the trained personnel required to fill the higher command and staff positions in Reserve and Guard units. From them will come the strength and professional skill that is prerequisite to a sound national defense.

AID

A Staff Article

NAVY CAREER MANAGEMENT

IN the Navy of 1775, ships were manned by civilians who enlisted only for the duration of a particular cruise—a method of recruitment soon outmoded. With the advent of steam-driven ironclads, ships of steel, submarines and aircraft, and later technological advances in radar, electronics and sonar, the chance assignment of nonspecialized persons to perform the complex tasks of shipboard operation was no longer feasible. The modern Navy could not conduct its vast operations without specialized personnel.

The Navy recognized during the course of this evolution that mobilization of men is more than the mere mobilization of bodies. Men must be fitted into their organizations as carefully as any specialized piece of equipment must be used for the purpose for which it was designed. Thus a carefully planned program, embodying all of the complex processes of selection, classification, job analysis, placement, training, promotion and retirement, was developed to provide the most effective and economical use of available human resources.

Under the Navy program, administrators are trained, often at leading universities, in the concepts of scientific personnel management. Just as the Navy benefited from the new mechanical devices and methods developed by industry, so it also adopted from business and industry and from educational institutions the best personnel management procedures that could be applied to its own organization.

The Navy, however, is faced with certain problems peculiar to its own organization and facilities. A ship at sea must be a completely self-sufficient unit and the men aboard must be able to perform all of its required services. For compassionate reasons sea-to-shore rotation also must be provided. As an example of the magnitude of the problem, a 2200-ton destroyer which during peacetime carries a complement of 247 men requires the performance of 525 different jobs for its

Prepared in cooperation with the Bureau of Naval Personnel.

operation. Even the ship's cook must be trained for such jobs as gun crewman, ammunition handler or member of a damage control party. To meet this situation the Navy weighs its knowledge of the qualifications and capabilities of its recruits against the jobs to be filled. It has developed a planned system that carries a recruit from his initial enlistment to the day he retires.

The salient features of the Navy's enlisted career program and officer career program are traced in broad outline in the following pages.

Enlisted Career Program

The background of the Navy's career system is its rating structure or career ladder. This is widely publicized to potential recruits through the U. S. Office of Education and in the Navy's *Occupational Handbook.* The handbook contains 62 vocational information briefs covering the major job family groups. It describes concisely each rating, its duties and responsibilities, work assignments, qualifications, training and possible advancement opportunities.

A Job Classification Code applicable throughout the Navy has been developed as a means of identifying personnel qualified for certain types of jobs. It also provides a means of designating a specialty or a degree of skill within a rating by means of a number code.

Skilled recruiters counsel applicants for Navy service and determine not only what the individual wants from the Navy but also what the Navy can offer the man. If the applicant seems fitted for Navy life he may enter it through one of seven general recruit apprenticeship categories: seaman, fireman, construction, airman, hospital, dental or steward. From these general apprenticeships he may pass to one of twelve occupational groups and then to one of the 62 major job fields.

Having completed the medical, moral, aptitude and other examinations required for entrance into the Navy, the recruit takes his basic training at either the Great Lakes or San Diego Naval Center. There he is tested for technical aptitudes. His qualifications are appraised as a basis for further Navy schooling or assignment to duties afloat or ashore.

Once a recruit is selected for and graduates from a service school, he is designated as striker for the rating he has been studying. This means that he is definitely slated for

that particular rating when qualified. If he is assigned to ship or shore duty he learns by doing an actual job, by studying promotional courses or completing USAFI training courses. As he obtains particularized skills he is assigned a job code number indicating his qualifications.

Within the Navy's enlisted rating structure, personnel are required to meet certain qualifications before they may be advanced in rating. Length of service, proficiency in rating and conduct, and specialized training are basic considerations, as are recommendations by commanding officers and successful completion of written examinations. A candidate for promotion must be thoroughly qualified for any advancement for which he is recommended. Moreover, these qualifications become increasingly stringent as the scope of his responsibility is enlarged. A quota system has been established for the petty officer grades and a competitive examination system instituted. The best qualified men are promoted on the basis of a weighted multiple which includes the examination mark as a major factor. Chief petty officer candidates are required to qualify through a periodic service-wide examination whereby only the highest scoring candidates are selected within quota limits.

Promotion opportunities are offered to all Naval personnel who remain in the service for any length of time, dependent only upon the individual's adaptability and capacity for mastering available training. Straight promotion ladders are open to the recruit, permitting his advancement through the successive pay grades to chief petty officer.

A chief petty officer must be skilled not only in his particular job but in every skill required of any rate within his own rating group. He must be qualified to train younger and less skilled men. Meanwhile he is also being prepared for possible officer status in the event of mobilization.

The success of the career planning program may be measured by the fact that today approximately 50 per cent of all commissioned officers in the Navy have had former enlisted service, as have a large percentage of the current Midshipmen in classes at the Naval Academy.

For those who do not attain officer status during 30 years of service, full retirement benefits are provided. After 20 years of service they are eligible for inactive duty in the Fleet Reserve with retainer pay and retirement benefits after a ten-year period.

Pattern for a Navy Officer's Career

The meticulous planning and management of the 30-year career of a typical Navy officer are best illustrated by the following resume, tracing the experience of one such officer from the time of his graduation from the U. S. Naval Academy.

Years of Service	Rank	Billet	Type of duty	Assignment	Optional Training
1 2	Ensign	Cruiser	 Caribbean	Various Technical Duties	Five-term College Training Officer Special Schools Correspondence Courses
3 4	Ensign Lieut. (jg)	Destroyer	 Mediterranean	Communications and Navigation	
5 6	Lieut. (jg)	LST	 North Atlantic	Gunnery Officer	
7	Lieut. (jg)	General Line School	 Newport, R. I.	Post-graduate Student	U. S. Naval Postgraduate School General Line School Civilian Colleges Intelligence School
8	Lieutenant	Reserve Training Ship	 Chicago, Ill.	Officer in Charge	
9	Lieutenant	Aircraft Carrier	 North Atlantic	Gunnery Officer	
10 11	Lieutenant	Amphibious Group One	 North Atlantic	Aide to Commandant	
12	Lieutenant	Hq. 8th Naval District	 New Orleans, La.	Administration	
13	LCDR	Armed Forces Staff College		Student	

		District	New Orleans, La.		
13 14	LCDR	Armed Forces Staff College	Norfolk, Va.	Student	Naval War College
15 16	LCDR	Cruiser	Pacific	Assistant Operations Officer	Army Command and General Staff College Air Force Staff College (command and staff courses)
17	LCDR	Destroyer Escort	Pacific	Command	
18 19 20	LCDR Commander	Department of the Navy	Washington, D. C.	Administration and Planning, CNO	
21 22	Commander	Cruiser	Mediterranean	Operations Officer	Naval War College Air University Army War College (strategy, tactics, logistics)
23 24	Commander	Mission to Brazil	Brazil, S. A.	Naval Attache	
25	Commander	Destroyer	Pacific	Commanding Officer	National War College Industrial College of Armed Forces
26	Captain	Destroyer Division	Pacific	Commanding Officer	
27 28	Captain	Amphibious Base	Little Creek, Va.	Commander	
29 30	Captain	Amphibious Force	Atlantic	Commander of Transport Div.	
31	Selected for Rear Admiral or Retired.				

Officer Career Program

No less emphasis has been placed upon the complexities of procurement, appointment and placement in the commissioned grades. Every facet of the Naval officer's career, from the administration of his initial oath to his retirement, is directed toward qualifying him to command ships.

The officer's qualification for appointment may be his training at the United States Naval Academy, in the Naval Reserve Officers Training Corps or in the Naval Aviation College Program conducted at any one of 52 colleges, or in the Midshipman Flight Training course. He may also be eligible as a commissioned warrant officer, a warrant officer, a chief petty officer, a petty officer first class of the Regular Navy, or by reason of specialized training in a civilian college.

Evaluation of his physical, moral, mental and professional qualifications is made by a board of commissioned officers to determine his fitness for command. An analysis is made of his education, experience, special abilities and the like to determine in which type of work he can be expected to excel. Experience, performance, training and technical qualifications receive consideration.

The newly appointed officer is then assigned to a billet where he will fully utilize his own specialty and where his experience and ability may be broadened to include all of the specialties within that particular billet. His whole career is thus a series of assignments to various billets, some on shore, some at sea and some in training where by rotation of duties he will develop his command capabilities. (See preceding chart.)

The officer's rotation of assignment is controlled centrally in Washington. Here, by review of semiannual fitness reports and study of the recommendations of his superior officers, each step of his progress is carefully scrutinized and guided. Billets are tempered so as to balance the experience gained by shore duty with that of sea duty. Formal academic training also is provided at frequent intervals.

Officer promotions above the grade of lieutenant (junior grade) are based primarily upon performance as evaluated by boards of examining officers. Time in grade also is considered as a factor but is not in itself a qualification for advancement.

Based on the needs of the service and considerations of experience and demonstrated ability, a certain number of the most senior officers in each rank, eligible for selection by

virtue of completing a specified time in grade, are designated in the "promotion zone." Any officer in the zone, or senior to it, who is not recommended for promotion is considered to have "failed of selection." In the event an officer completes the total number of years of service specified for each grade, has not been recommended for promotion and has twice failed of selection, his retirement or separation from the service is mandatory. Selection boards may also choose eligible candidates from below the promotion zone, thus accelerating the advancement of outstanding officers in each grade. For flag rank, boards may make selections from below the promotion zone in unlimited numbers. In selection for lower grades, the number is limited to five per cent of the authorized total to be selected. At all times selection of the best fitted officers is paramount in the promotion procedure.

MILITARY POWER AND NATIONAL POLICY

By

LIEUTENANT GENERAL MANTON S. EDDY

OF ALL the instruments of policy, the United States has consistently had the least understanding of the use of armed strength. In a world where military power plays a bigger role than ever before, this Nation dare not remain on its habitual course of blindness toward the fact that, like it or not, force is the final authority of policy.

The greatest problem facing the American people is the survival of the United States. That is an obvious proposition. But how many Americans see in it an urgent demand for personal action?

The present world situation is a strange mixture of incongruities. We have a declared peace—but it is an armed, uncertain peace, with a first-class war going on in China. Four and one-half years ago we won a great military victory, but some of our allies of yesterday are the most threatening potential enemies of tomorrow. At the same time, old enemies have become weakened and dependent allies.

We have the United Nations, organized as a politically accepted instrument of international peace and order. Yet with due regard to its many worthwhile activities, it is not functioning as effectively as had been hoped. We have new, free nations emerging and gaining strength—India, Pakistan, Israel, Indonesia and the Philippines. Meanwhile other nations, such as Hungary and Bulgaria, are submerging all but their names to the control of a foreign government.

What is the reason for this? As contradictory as the situation appears on the surface, there is one basic reason—aggres-

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sive international Communism. This false ideology is actively promoted by the government of a major world power as a part of its foreign policy. That is the crux of the matter.

International Communism is the doctrine of complete subjugation of all individuals to the state and subjugation of all states to Russia. The means that aggressive Communists will employ are any and all to accomplish their aims—subversion, fear and force. We should all be willing to recognize this program and take action for the survival of a free America.

The United States stands as the strongest member of the free democratic camp. We are bending every effort to revitalize the other members of our camp by Marshall Plan aid, the Atlantic Pact, the Rio Pact and the Military Assistance Program. The potential military threat demands not only that the United States be strong but also that our friends be able to stand with us.

We have finally come of age. The bipartisan foreign policy, European aid measures, support of the United Nations, and western hemisphere solidarity—all attest not only to our good will but to our maturing common sense as a nation.

The big question is whether or not we have matured enough to be thoroughly convinced that adequate armed strength is the only element of the democratic camp which is respected enough to maintain peace securely. We still tend to seek an easy out for this military part of our obligation to humanity and our responsibility for self-protection. By we, I mean, of course, the people of the Nation—for without their expression of will in these matters, there is no policy of any kind, domestic or international, civilian or military.

In referring to national military policy, I am referring to it in its absolute sense—the policies of our civil government. The military leaders, including the Joint Chiefs of Staff, make no policy of this sort. They implement and enforce the policies of the Government, which acts for and by the people.

The principle of civil control of the Armed Forces always has been and remains accepted without qualification or desire for any other relationship. Our concern is that the people must recognize what in the long run are their military problems. They must think about them and act accordingly. National policy on military matters can rise no higher than its source, and that source is the people.

The military strength of any nation is a complex structure of a good many factors other than numbers of armed men,

ships, tanks, guns, and airplanes. It includes the nation's economic power, its natural resources, its geographical position and its national spirit for survival. These are all fused into what General Marshall was fond of calling the "military posture" of the Nation. That expression is descriptive of the compound structure of the national policy. That policy is not a two-sided object—one civilian and one military. In the cold light of international affairs, the United States is viewed as a single entity and is so accepted by the world.

In war, the spirit of America has never been found lacking. But somehow we never seem to maintain the same attitude in times of peace. When the bugle blows we are off to the fight; when the last shot is fired, we are even more quickly off to our homes—before the peace is won.

This is not the considered policy of statesmen. It is a condition imposed by the impact of public opinion on our policies. It is a reflection of national spirit. The statesman may be wise in vision and the professional soldier may plan and advise prudent preparedness; but in our democracy, if the public will not support them, there is no gain to the Nation. It was this lack of military spirit—or call it indifference, if you like—that twice found us unprepared. . . .

The United States, inevitably the leader of the free world, has recognized the danger before us. The basic policies of our Government and the ideals of our people are obviously opposed to the aims of the aggressor now on the loose. The instinct of self-preservation is enough to make us realize that our vital interests are at stake. But American policies, ideals and instincts are meaningless unless transformed into action. Policy without power is like a ship without sails.

Recognition of the danger will gain us little unless we prepare to meet it, and this is why personal action is called for. Every citizen must decide for himself whether he is satisfied that his Nation is spiritually and physically prepared for the troubled days ahead. . . .

We have adopted a national policy which says: the United States wants to live and let live. We believe the world should be a neighborhood in which each member helps his neighbor but does not try to run his private affairs.

In seeking peace, the United States has tried to act with fairness and amity toward all peoples. We have sincerely supported the United Nations. Where it was within our power to give help, and where it was wanted, we have offered to lend

a hand. With our friends we have joined mutual defense pacts. From Japan to Greece, Italy and Germany, we have encouraged democracy and the right of human beings to live as free people. We have worked successfully with our good neighbors to the north and to the south.

In our efforts for peace we have, of course, been forced to look to our military strength. Although we are weak in some respects, our military power could certainly be less than it is. On the other hand, we must be at least as realistic in appraising our own strength as an enemy would try to be in calculating whether or not he should risk war.

The nature of military power of the United States and its friends will largely determine whether peace shall continue, or whether war, if it comes, shall turn to our advantage. As stated recently by Secretary of Defense Johnson: "Our security depends, first, on our own strength, and second, on the strength of our allies. We can no longer isolate ourselves from the rest of the world or rely on our own arms alone."

The European Recovery Program has had remarkable effects. While much remains to be done on the economic side, there is ample evidence that our allies are beginning to help themselves. The Western democracies are becoming more stable although some of them still have serious political troubles. People are regaining the will to live. These Western European nations are placing heavy reliance on the Atlantic Pact and on the military equipment the United States will furnish under the Military Assistance Program as they continue on the road to economic health.

No worthwhile basis for defense would have been possible without the rebirth of spirit in western Europe. This first goal has been achieved. What, then, of the military situation in the region of the North Atlantic? . . .

At this early stage in allied defense planning there is one fact on which there is universal agreement. It is that the combined land forces of the Allies, including the United States, are far from sufficient. In air and sea power the Allies are relatively well off. On the ground they are definitely inferior. . . .

The dominant military forces in Europe today are the armies of the Communist nations. It is little comfort to the people of Europe, who are faced with these armies, to be assured that the United States can make exchanges in a bombing war of attrition against the enemy homeland. If that is our

only military capability, they will be caught in the middle, overrun, occupied, despoiled and exploited to feed the Communist war machine. What military strategy would our policy dictate then? Would we bomb our friends because they had been overrun? They do not relish this prospect, and we must consider that it might at some time weaken their resolve.

How does our military posture impress an aggressor? Do the imperialistic Communists see us as the Germans did in 1914 and 1939? I do not pretend to know the answer; however I can make an estimate.

They have failed repeatedly to show any signs of cooperation in the efforts of the West to establish a firm peace. They maintain an armed force which, by no stretch of the imagination, could be termed defensive—certainly not in the light of the forces that exist in the democratic camp. They are aiding and abetting the war in China. They are supporting rebellion and disorder elsewhere in the world in a manner that makes Hitler and Mussolini look like rank amateurs.

What should our policy be in such a world? General Bradley has expressed a policy which merits most thoughtful consideration. It is the concept that we should be strong enough to deter a thinking aggressor and yet not so strong as to give any reasonable cause for creating fear of us. Such a strength can be estimated for any given cycle of international relations. It is, of course, a variable which changes as political conditions change and scientific developments are made. In any event it must be a balanced force so far as all factors of national power are concerned.

As a nation, we are the greatest single force for peace in the world today. Our greatest danger will lie in any inclination to forget or dodge the responsibilities which are ours.

If the philosophy of the people does not include a spirited and realistic military attitude, then there is little hope that we can live up to our obligations in a realistic world. All the good will on the earth will not, by itself, establish a respected military posture in the eyes of the world.

Our top military planners have developed and recommended sound, realistic and workable plans for military action in support of our national aims. If thinking citizens will make clear to their representatives in government the kind of national policy they want, the Armed Forces—and the Army as a vital member of the team—will work out a safe and economical military policy to support it.

ARMY AVIATION SURVEYS THE BATTLE

By

LIEUTENANT COLONEL JACK L. MARINELLI

SINCE the advent of the airplane, the potential value of aircraft as the eyes of the ground soldier has been strikingly apparent. At every opportunity, armies have fought for higher ground so as to have observation and command of the adjacent terrain. Scouting parties on perilous forays found that it was not always easy to see over the next hill. The artilleryman particularly was largely dependent for success upon the availability of observation posts from which he could visually adjust fire. Church steeples, high trees, telephone poles—all were valuable in increasing his visual range. He even developed a portable observation tower for that purpose.

In his quest for a better vantage point, the artilleryman looked also to the air. In World War I he used currently existing types of aircraft and the captive observation balloon. The balloon, however, was not the final answer. Its usefulness was limited by its vulnerability to enemy action; moreover it required a large ground crew for maintenance. It was natural therefore that artillery specialists should develop the potentialities of the highly maneuverable light airplane.

Mindful of the handwriting on the wall in 1940 and 1941, many Army officers, private pilots, aviation enthusiasts and defense-minded citizens urged the War Department to consider adopting the light plane as standard Army equipment. In 1941 four Piper Cubs participated in the Second Army maneuvers at Camp Forrest, Tennessee, and in smaller scale maneuvers, largely of Cavalry units, at Fort Riley, Kansas.

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Following the success of these initial tests, the War Department invited the light airplane manufacturers to participate in the maneuvers of the 1st Cavalry Division at Fort Bliss, Texas, and in the vastly larger maneuvers of the Second-Third Armies in the Louisiana-Texas area that same year. The maneuvers demonstrated the value of the light airplane far beyond the expectations of Air Force and Ground Force commanders and arrangements were made for the purchase of a limited number. From this beginning, Army aviation soared into prominence as a significant element in warfare.

In the North African invasion the Army light plane was introduced to combat. During the early landings, an Artillery Cub plane winged its way from an aircraft carrier sixty miles at sea to an airport just north of Casablanca to become one of the first United States airplanes to land on French African soil. Succeeding operations demonstrated magnificently the combat utility of the Cubs. The enemy, fighting a defensive campaign in which he was able to select his battleground, invariably chose to defend the high ground which assured him all the natural observation posts. Overcoming this advantage, our air observation posts provided target data for the artillery and intelligence on enemy operations.

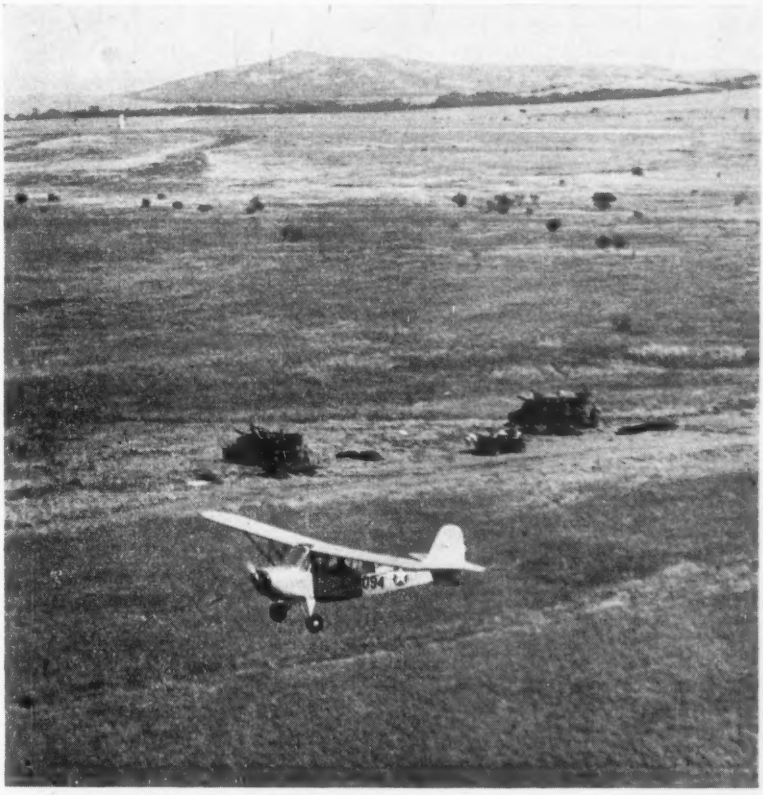
Hovering over the battle lines, our light planes enjoyed a relative immunity from attack, belying predictions that they would be shot out of the air immediately after take-off. This immunity was due largely to the protection offered by the Air Force and to the enemy's failure to evaluate properly the importance of the light plane to our operations. Then, too, the planes generally were flown within the protective zones of our antiaircraft fire. When on tactical reconnaissance over enemy ground troops, they maintained altitudes out of range of small arms fire. If attacked by enemy fighter planes they could escape because of their own slow speed and maneuverability. When the effectiveness of these Air OPs became known to the enemy, determined efforts were exerted to knock them out of the sky and it was not unusual for Messerschmitt 109s or Focke-Wolfe 190s to go "Cub hunting."

In combat, liaison planes were used principally in registering and adjusting artillery fire. Day after day they performed dawn-to-dusk patrols of the battlefront. They reconnoitered enemy positions, sought out gun emplacements, personnel, supplies, fuel dumps and convoys. They also proved their usefulness in emergency resupply of our forces and evacuation

of the wounded. They were employed in wire laying, checking camouflage, messenger and courier service, transport of personnel, column control, route reconnaissance, aerial direction of fighter bombers and emergency rescue. To a limited extent they were also used for aerial photography of enemy lines and positions.

From a few Piper Cubs in 1942, organic Field Artillery observation planes were increased to more than three thousand assorted Piper L-4s and Stinson L-5s in 1945. Their record of accomplishment in World War II was substantial. Bringing with it new customs and traditions, the light airplane has become an integral part of the Army.

Army aviation has been further expanded in the postwar



U. S. Army Photograph

The most familiar plane for observation of artillery fire is the L-16A type pictured here in flight over the Fort Sill artillery range.

era. The number of airplanes authorized Field Artillery units in current Tables of Organization and Equipment is about twice that of World War II. Aircraft also have been authorized as organic equipment in many other units such as separate Tank battalions, Engineer, Signal, Infantry and Armored Cavalry units. Field maintenance of Army aircraft—formerly an Air Force function—has been assigned to the Ordnance Department, with many air items of supply now furnished by the Technical Services.

In all essential characteristics, the Army airplane is basically the standard commercial airplane of the light plane industry. The helicopter, an innovation little used in wartime while it was largely in the experimental stage, is receiving increasing emphasis. It has been hailed as the answer to many of the air problems not solved by light fixed-wing aircraft. The ability to hover at zero miles an hour, to fly backwards and sidewards as well as forward at virtually any speed and to land, even without power, in areas only slightly larger than the rotor itself, are factors of immense importance in accomplishing specialized military missions. Various types of helicopters are currently being developed and tested by the Army.

Selected officers of the various arms and services employing aviation are given basic flight training by the Air Force at Connally Air Force Base, Waco, Texas. The five-month course provides training in the fundamentals of flying, navigation, maintenance, meteorology and allied air subjects. After completing the Air Force basic course the student is transferred to Post Field, Fort Sill, Oklahoma, for training in the tactical phase of Army aviation. In this 2½-month course he learns artillery adjustment, aerial reconnaissance, advanced map reading, maintenance, aerial photography and operational flight training.

After a period of duty with tactical organizations some aviators are selected to attend the five-week Helicopter Pilot Training Course at Connally AFB. Here the student receives basic instruction in helicopter flight and maintenance. After completion of the Air Force portion of the course, he is transferred to Fort Sill for an additional five-week course in operational flight, advanced maintenance and tactical uses of the helicopter.

Selected enlisted men are trained as Army aviation mechanics at Sheppard Air Force Base, Texas. Here they are taught

aircraft maintenance on each of the types of aircraft currently being employed by the Army. The thirteen-week course qualifies them for complete maintenance of Army aircraft on the organizational level. A separate course of instruction at Sheppard AFB trains Army mechanics in the fundamentals of helicopter maintenance.

To prevent Army aviators from becoming too specialized and thus losing contact with their basic branch, a career program has been established that will alternate officers between flying duty and ground duty assignments. After an officer has completed a maximum of five years of flying duty, he will be assigned to ground duty for a minimum of three years. Army aviators in a ground duty status may be permitted to continue flying in order to maintain their proficiency if they so desire.

A separate career field—leading to a warrant officer rating as the top grade—is being established for Army aviation mechanics and aircraft maintenance specialists.

Army aviators in the Organized Reserve Corps are given opportunity to maintain their pilot proficiency under a program that permits qualified ORC aviators to utilize commercial aircraft at Government expense. Some restrictions are imposed as to class, size and weight of commercial aircraft that can be used so that the aircraft used for training will be essentially similar to those used by the Army.

Drawing on new developments in the commercial aviation field, the Army for the most part procures its light aircraft from commercial sources using types readily available on the

U. S. Army Photograph

The four-place "staff car" airplane is typified by the L-17 (Navion).

open market. For reasons of economy, Army Field Forces expects to continue meeting its training requirements—in peacetime and during the initial phases of any future war—with modified off-the-shelf commercial aircraft. Such aircraft can be purchased for a fraction of the cost of specially designed military aircraft. As a further assurance, the Army and Air Force have assisted aircraft manufacturers in building light aircraft and component parts which meet military requirements while also satisfying the needs of the commercial market.

Although many new weapons and techniques are being developed for use in modern warfare, particularly in the realm of antiaircraft weapons and fighter aircraft, effective countermeasures are also under development—measures that would enable light aircraft and helicopters to play their significant roles in any future combat employment of Army Field Forces.

U. S. Army Photograph

The helicopter is rapidly assuming an important role in Army observation missions. Here an H-13B helicopter hovers above a firing battery.

STOCKPILING MATERIAL FOR DEFENSE

By

MAJOR GENERAL A. B. QUINTON, JR.

THE Munitions Board's periodic report to the Congress on developments in stockpiling during the last six months of 1949 marks a significant landmark in the Nation's five-year program for the stockpiling of materials critically needed in any future emergency.

Under the Strategic and Critical Materials Stockpiling Act of 1946, the Federal Government is authorized to acquire and retain stocks of materials required for industrial, military and naval needs in a war emergency where there exists a "dangerous and costly dependence" of the United States on foreign sources of supply. The Act also instructs the Departments of Agriculture and Interior to foster the conservation of strategic and critical materials and to search for substitutes and new sources.

The stockpiling program is administered under the general coordination of the Munitions Board. The Interdepartmental Stockpile Committee, representing the several Government Departments and a number of Industry Advisory Committees, assists the Munitions Board in such matters as determination of objectives, drawing up of specifications and forecasting of long-term trends in availability and consumption of strategic materials.

In the evolution of stockpile policies, the stockpile itself is considered in four different ways. First, the stockpile is a physical reserve of definite quantities of materials owned by the United States Government and stored mostly on Government-owned property and in Government warehouses.

Second, the stockpile is an inventory of raw materials with a cash value. It is a recoverable asset owned by the people of the United States. In this sense it is an insurance policy, the outlay for which would be returned many-fold should the

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stockpile be used, and yet until it is used it retains value indefinitely.

Third, the stockpile is a basic element and an integral part of the national defense structure. It is not a military element but is intended for all essential uses, both civilian and military, in time of emergency. It is closely linked to the national security, particularly industrial mobilization planning for military and civilian requirements in time of national emergency.

Fourth, the stockpile provides a tremendous reserve of manpower and time. The stockpile represents manpower and time in two ways. An ample reserve in the stockpile of tin, for example, represents manpower. It takes man-hours of labor to mine the ore, to load it aboard railroad cars and bring it to the water's edge, to load it into the ore boats, to bring it to the smelter. It takes more labor to mine the coal needed in the refining process and to bring the coal to the smelter. More man-hours again are needed to transport the tin from the smelter to stockpile depots located near consuming centers of tin. Obviously, if all this is done in advance, time and manpower are stockpiled along with the tin.

But the amount of manpower represented by our reserves in the stockpile is infinitesimal compared with the additional manpower that would be required to carry out essential war-supporting industrial programs without the use of these materials. The enormous efforts by the United States to overcome the shortage of rubber during World War II are illustrative. Millions, if not billions, of dollars and weeks and months of time were required to overcome this one shortage. In war, time itself has tremendous value. The daily cost of World War II to the United States reached a peak of about one-half billion dollars. Measured in these terms, the cost of the entire stockpile when completed would be only a few days. Yet it certainly would have saved many times that amount of time and money had we had such a stockpile at the outset of World War II. In the final analysis, materials are stockpiled on the basis not of the manpower required to produce them but of the manpower that would be required in wartime if these materials were not available.

Stockpile objectives are kept current by a continuing review of such factors as changes in basic production and consumption, international relations and commercial situations, domestic agricultural and industrial policy and conditions, economic and political stability of sources, technological de-

velopments at home and abroad, problems of ocean freight and other transport, and trends in foreign and domestic productivity. Strategic considerations include supply problems and the methodology of calculating military and war industry requirements. In addition, before the Nation's wartime industrial requirements, both civilian and military, can be regarded as realistic, they must be tested for internal consistency and proper relation to their secondary impact on such services as transportation, communication, construction and electric power.

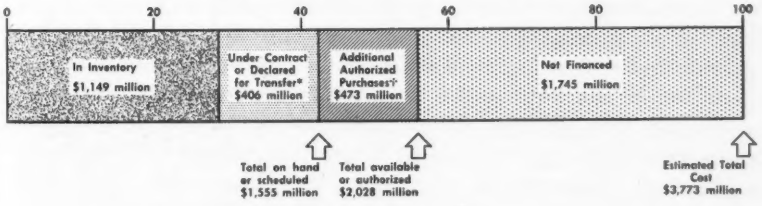
The ultimate objective of the stockpile is to strengthen the national security. Other results of stockpiling are secondary to this prime purpose. Nevertheless, two important secondary efforts deserve notice. Stockpile procurement of materials from outside the United States provides an important source of dollars with which other nations can buy United States exports. Stockpile procurement of domestic materials strengthens the capacity and position of domestic producers. Thus these two favorable secondary effects enable a high rate of stockpile procurement with minimum disfavorable impact on the national economy.

At the close of the calendar year 1949, after three and one-half years of stockpiling, 41.5 per cent of the dollar value of stockpile objectives were either on hand or on order. About $1,149,000,000 or 30.4 per cent were on hand and $416,000,000 or 11.1 per cent were on order. Appropriations for fiscal year 1950 will enable completion of 53.7 per cent of the stockpile.

Financial Status of the Stockpile Program

31 December 1949

Per Cent of Estimated Total Cost of Objective



* Programmed for Delivery in FY 1950.

† Includes Items Programmed for Delivery after FY 1950.

KEEPING THE ARMY'S EQUIPMENT RECORD

By

MAJOR JAMES G. COATS

WITHIN minutes after the commander received orders to move a regimental combat team, fully equipped, to another army, a smoothly meshed equipment accounting system was put into action. At army headquarters, status cards speeding through electrical business machines showed that the combat team lacked the required number of two and one-half ton trucks and field ranges. Quickly the status cards were reshuffled and run through the machines to show the location of all such equipment in the army area. It was then a simple matter for the G-4 to order the withdrawal of these items from units least in need of them. The RCT left for its destination, on schedule and fully equipped, thanks to the Army's streamlined equipment status reporting system.

Employing electrical accounting machine methods, this newly developed system is designed to keep commanders of all echelons informed on the status of major items of equipment throughout their commands. At the field army and theater headquarters, a machine-coded perpetual inventory file is maintained on the status of some 8000 principal items of equipment in each unit and station within the command. These items—ranging in size from a heavy tank to a prismatic compass—include all materiel essential to the operation of combat and service units.

The reporting system concerns itself with complete items such as weapons, vehicles, field ranges, tentage and other essential individual and organizational equipment. However, some major components for weapons, vehicles, radios and other assemblies are also included. Collectively, the reported items represent about 85 per cent of the dollar value of Army assets.

Starting point of the system is the Reportable Item List,

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published by the Department of the Army. The list of 8000 items encompasses all equipment needed for battle readiness by combat units, all equipment required by combat support units to carry out their missions, and all supply control principal items. The latter category includes items which because of their critical nature—such as difficulty of procurement or short supply—are under special study by the Chiefs of the Technical Services. After initial reporting is completed, the 8000-item list is used only as a reference document by each reporting activity. Subsequent status reports are made only on equipment stocks previously reported or newly received.

A perpetual inventory file, maintained on punched cards at theater and army headquarters, indicates the current state of readiness—in terms of equipment—of an organization or groups of organizations and the inventory status of any major item of equipment at various echelons in the army or theater area. The perpetual inventory file at the field army headquarters is maintained by a section of the Adjutant General's Machine Records Unit. This section, composed of one officer and twelve enlisted man and a basic set of MRU equipment, can move with the field army or task force headquarters during combat operations.

The basic information to be reported on each item of equipment includes: total quantity authorized by the Tables of Organization and Equipment, the total amounts authorized by current operating allowance, and the actual quantity on hand. Periodically—at the request of the Department of the Army or field army or theater headquarters—additional information on condition, consumption for a given period, and estimated requirements for a future given period is reported.

The requested information is transmitted to the Department of the Army on punched cards so as to allow for the consolidation of world-wide inventory and equipment status information. This data is used for such purposes as stock control, requirements studies, mobilization planning and budget and procurement planning.

The system offers a relatively easy method of satisfying demands of management for information since the unit or installation which maintains the basic accounting record for property also makes the report. For T/O&E organizations the reporting activity is always the company or detachment—the unit which maintains the company property book.

After initially reporting on the 8000 selected items of equipment, the unit is required to report only the changes that occur in the status of about 200 items. The latter figure represents the average number of selected items that a unit normally is authorized to have on hand.

In submitting his initial report, the company commander reads down the entire Reportable Item List and reports only those items that are authorized or on hand in his company. At the army headquarters a MRU prepares punched cards based on this initial report and codes them with the company's identification. From this card record an Equipment Status List is prepared by machine showing the quantities on hand of the 200-or-so items reported by the company.

The company renders a monthly report of change by correcting a copy of the preceding month's Equipment Status List. New punched cards based on this corrected list are prepared, and each month the cycle is repeated. By this method an infantry company, for example, need not wade through a large number of extraneous items used by a division signal company or a medical unit—items which are included in the master Reportable Item List.

Each unit or activity reports the status of its equipment to the headquarters of the major command in which it is located. For the battalion or regiment, the system provides a method of keeping commanders informed on the status of subordinate units. By this means data is relayed to higher headquarters without the time-consuming task of manually consolidating supply records as was formerly required. On the division level, the system keeps the commander and his staff informed on the preparedness status of subordinate organizations. For the field army or theater, the system provides an up-to-date record of the equipment situation in its organizations and the status of equipment in station stocks.

The necessity for getting the most economical return possible from every defense dollar makes effective stock control mandatory throughout the Army. Stock control—sometimes defined as keeping the right supplies in the right place at the right time—requires that equipment be distributed in accordance with prescribed allowances. Where shortages exist, available equipment must be distributed or redistributed to organizations and activities according to their relative priorities. In this endeavor, the Army's streamlined system of inventory control and equipment status reporting adds immeasurably to the speed and efficiency of an essential operation.

CHARTING THE ARCTIC

By

CAPTAIN C. L. MCDERMOTT

BEFORE many of the offensive and defensive actions of World War II could be launched, the U. S. Army Air Corps had to provide photographic maps of uncharted parts of the world's surface. By the end of the war these newly mapped sectors aggregated approximately one-fifth of the area of the United States. Despite the fact that for thousands of years people have sought to establish their bearings on the land, at sea and, more recently, in the air by the use of existing maps, only about one-tenth of the surface of the earth had been charted with any accuracy.

The North Polar Region is one of those areas about which information has been conspicuously meager. While Admiral Peary and other Arctic explorers brought back much valuable knowledge, postwar defense planning requires more extensive, more detailed and more exact cartographic data than ever has been available.

In June 1946 the 160 officers and 900 airmen of the 46th Strategic Reconnaissance Squadron (subsequently redesignated the 72d) were assigned the three-year mission of reconnoitering and charting an area so vast that it entailed flying 2,000,000 linear miles traversing the area from lower Alaska to the top of the world. Specifically the mission was three-fold: to complete the charting of Alaska and the surrounding area for the strategic location of defense units and installations; to obtain information necessary to establish air transport service; and to determine the possible existence of oil formations.

Basing on Ladd AFB at Fairbanks, Alaska, with seventeen RB-29 type aircraft and using aerial charting and photographic equipment and techniques adapted to the area, the squadron finished its job in June 1949. In the course of its operations it developed and improved a special navigational system. The mission also marked the first attempt by an Air Force

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tactical organization to carry on sustained polar operations under conditions prevailing in Alaska.

The intricacies of ordinary map-making indicate the magnitude of the Arctic operation. Years of manpower and millions of dollars have gone into the simple road maps that the American motorist uses. Even so, the most up-to-date United States maps are not entirely accurate. Neither does the overall world map present a completely true picture. As late as 1948 scientists, astronomers, civil surveyors and explorers were still trying to establish the exact locations of the various world continents in relation to one another.

Charting so large an area as the North Polar Region by photographic means entailed flying thousands of exact and parallel courses completely covering the area. When weather permitted visual contact, a system of trimetrogon aerial photography was brought into play, wherein one vertical and two oblique cameras were used to take overlapping pictures of the terrain. In periods of low visibility, radar was employed with a photographer taking 35mm overlapping pictures of the radar scope.

Surveying missions ranging from ten to thirty hours of continuous flight were made with as many as 2500 photographs taken on a single flight. The resulting photographs were fitted together to form a huge photo-map. From this cartographers and photogrammetrists plotted aeronautical charts. As revealed by the survey, Bathurst Island in the Canadian Archipelago, which appears on conventional charts as one huge U-shaped island, was found actually to be five separate islands. It was discovered, too, that the attitude of Banks Island, off the coast of Canada, was 20 degrees different from previous supposition. It was determined further that there are in the North Polar Region three areas of intense magnetic activity—not one, as previously supposed. In addition, anomalies which had been pre-positioned as much as eighty miles from their current exact locations were spotted within a few miles of their true bearings. During a period of three years this northern wilderness was changed from a practically unknown land and ice mass to a relatively familiar area.

In the course of the survey, one of the squadron's planes was the first to fly precisely over the geographic North Pole. From this flight stemmed the "Two-Miles-North-of-the-World-Club"—made up of those who had flown at 10,000 feet exactly over the North Pole. Nearly 100 such flights were made.

Seeking accurate cartographic knowledge of the desolate polar land masses involved severe hardships. Survival itself was a battle. The aerial explorers had to be trained to sustain themselves despite frigid temperatures that dipped as low as 66 degrees below zero. Operation and maintenance of aircraft and allied equipment presented serious problems. Sub-zero weather played tricks with engines and fuel. Oil turned solid, fittings that had been tightened indoors contracted in the intense cold, pressure lines weakened and rubber hardened. Even problems associated with the health and morale of personnel were magnified many-fold. Maintaining a latrine in the intense cold, oddly enough, proved to be one of the bugbears of the entire project.

Human reaction to cold presented another barrier to operations. For example, in extreme temperatures nasal breathing causes bits of ice to form inside the nose. Air intake, therefore, must be through the mouth. But that again causes trouble, since the reaction of dental plates, bridges, and fillings to the cold causes extreme pain. Breathing in the Arctic has

USAF Photograph

During a flight over the exact geographic location of the North Pole, Robert N. Davis, civilian specialist, indicates its signal on a radar scope to Dr. Paul A. Siple, left, polar expert, Major Maynard E. White, Commanding Officer, 46th Squadron, and Lieutenant Wayland W. Williams, navigator.

its other perils, too. Frigid air endangers the lungs and physical exertion must be limited to avoid heavy breathing.

It was found that each mile-per-hour increase in wind velocity affects a human being's chill factor the same as a drop in temperature of one degree. In other words, a wind of 20 miles an hour at a temperature of 40 degrees below zero would have the same effect as a temperature of 60 degrees below zero on a windless day.

Under the best of circumstances, navigation without the aid of radio is difficult even when flying by compass along domestic air routes marked by beacons and landmarks. In the Arctic, however, ordinary navigation procedures are of little value because the intense magnetic influence there makes common magnetic and fluxgate compasses most erratic. Moreover, the lines of longitude are so close together that a pilot in flight is required constantly to change his bearing, with consequent loss of efficiency. For example, a course line from Fairbanks, Alaska, to Thule, Greenland, changes 78 degrees during flight due to the convergency of longitudinal lines. Navigators had to devise their own methods and procedures in order to complete the reconnaissance job. And they had to be right the first time.

To overcome the problem of finding and maintaining direction, these polar navigational pioneers developed a gyrocalibration system that utilized celestial navigational readings. From the British they borrowed the theory of grid navigation —a theory based on a series of evenly spaced lines constructed parallel to the Greenwich Meridian.

Until the 46th Reconnaissance Squadron began its intensive aerial survey there had been little development in Arctic navigation since the Byrd expedition in 1937, and the British grid system was merely a theory. Navigators of the 46th, after indoctrination by members of the famous Musk-Ox operation in Edmonton, Alberta, finally proved and improved the British grid theory and made it safe for use in the North Polar Region.

Courage, ingenuity and technical skill brought the Arctic survey to a successful conclusion. Aerial pioneers of the 46th, working as a team, were able to report the conquest of one of the world's last remaining frontiers. More than just another mapping job had been accomplished. The way was now paved for stronger polar defenses, for industrial development and for the opening of a new continent.

DIGEST OF SPEECHES

Extracts from speeches and public statements pertaining to the Defense Establishment

Secretary Symington:

A LANDMARK IN AIR ENGINEERING DEVELOPMENT

The "sonic barrier" is an invisible wall encountered when the flight of an airplane approaches the speed of sound —764 miles an hour at sea level. When an ordinary airplane approaches this speed, strange things being to happen. Its wings and controls flutter, excessive vibration sets in, and usually the airplane is difficult, and sometimes impossible, to control.

This sonic barrier is so important to modern aeronautical design that airplane speeds are now measured in terms of percentage of the speed of sound. This percentage is known as the "mach number." Aeronautical engineers give the speed of sound a value of one, and any speed up to nine-tenths of the speed of sound they call "subsonic speed."

Speeds between nine-tenths of the speed of sound (about 680 miles an hour) and up to about 1-2/10 times the speed of sound (about 915 miles an hour) are called "transonic"—in other words, the speed at which we pass through the sonic barrier. Beyond that barrier, speeds up to five times the speed of sound (around 3500 miles an hour) are called "supersonic;" and speeds beyond five times the speed of sound—that is, more than 3500 miles an hour—are called "hypersonic."

The Air Force has had subsonic and transonic wind tunnel facilities for many years, but it has never had wind tunnel facilities for tests at supersonic and hypersonic speeds. That is one reason why the tunnels to be built at the Air Engineering Development Center* are so urgently needed.

In technical terms, the Air Engineering Development Center at Camp Forrest, Tennessee, initially will be what is known as a "propulsion test center." Here we will use laboratory type tests, under closely regulated conditions, to help solve design and manufacturing problems encountered during the manufacturing and development stages of engines of all kinds. The test units are designed to simulate various conditions of altitude, temperature and speed. We expect to obtain much information which in the past we could get only by building the equipment and testing it in flight—an extremely costly and time-consuming method. When fully developed this center will be one of the greatest aviation test centers of the world. . . .

The Air Engineering Development Center is just one part of an integrated, unified plan to provide this Nation—the military as well as private institutions and industry—with the necessary facilities for exploring that relatively unknown world of flight beyond the sonic barrier so that we may continue to improve our ability to use the air space more effectively, both in peace and war.

This whole overall plan is the result of careful studies extending over the last five years by the Air Force, Army, Navy, the National Advisory Committee for Aeronautics, the Research and Development Board, the Air Force's Scientific Advisory Board, many private institutions including colleges and universities engaged in aeronautical research, and private industries.

These studies took a long time, not only because of the highly technical nature of the subject but also because it was necessary to establish without question that there were no existing facilities that could be altered or improved to meet the capacity requirements for the proposed supersonic and hypersonic test work.

By Public Law 415 the 81st Congress authorized $252,600,000 for the Unitary Wind Tunnel Program and specifically earmarked $100,000,000 of that amount for the Air Engineering Development Center. Public Law 430 appropriated an initial increment of 30 million dol-

* Now officially titled Arnold Engineering Development Center, in memory of General H. H. Arnold.

lars in contract authority and cash to begin construction during fiscal year 1950. With this 30 million dollars it is planned to begin construction of three principal test facilities.

The first facility planned is the high altitude engine test unit, which will make possible the testing of engines under conditions representing 75,000-foot pressure altitude. This unit would test jet engines much larger than those now used in our jet aircraft. It would have a testing capacity six to eight times the capacity of Wright Field units and would require about 75,000 horsepower.

The second principal test unit would be the hypersonic wind tunnel—capable of development evaluation testing of models of aircraft and guided-missile speeds in excess of 3500 miles an hour. In this research we would take full advantage of captured German designs and drawings as well as the services of the German designers. These German designs have been thoroughly checked by competent American authorities and have been modified to incorporate the most recent developments.

The third principal unit would be a supersonic propulsion wind tunnel, designed for development testing of scale models of high-speed aircraft as well as aircraft power plants. The speed range of this tunnel covers an important part of the supersonic range from the high transonic—about 900 miles an hour—well into the supersonic, which goes on up to several thousand miles an hour. Approximately 200,000 horsepower will be required to operate this tunnel—a power demand equivalent to that of the entire greater Nashville area. By comparison, the 20-foot wind tunnel at Wright Field requires only 40,000 horsepower. . . .

Construction on the site is planned for midsummer of 1950. If everything goes according to plan, the Center should begin limited operation within the next two or three years and should reach full operation within four to five years.

From an address by The Honorable W. Stuart Symington, Secretary of the Air Force, before the Nashville Chamber of Commerce, 10 February 1950

Secretary Gray:
YOUTH'S PLACE IN TODAY'S ARMY

About 60 per cent of the Army officers on duty today are 35 or under, and half of the enlisted men are 21 or under. As a matter of fact, the average age of the enlisted men is only 22, and that of the officers is 34.

This trend also is reflected in our civilian components. In the National Guard, for example, about 70 per cent of the enlisted men are 21 or less, and the officers are correspondingly youthful, only 12 per cent of them being pre-war Guardsmen. I might add, however, that nearly all of the officers and non-commissioned officers in the Guard today are combat veterans of World War II, so there is no lack of experienced leadership. . . .

This youthfulness makes for the vigor, flexibility and imagination that are indispensable in an effective fighting force, and our Army has those qualities today to an unprecedented degree. . . .

But youth is not the only asset the Army can claim today. We have progressively raised our recruiting standards until we are now getting nothing but the best type of young men and women from civilian life, with much higher educational background and capacity for learning than ever before in our history. We have recently added rigid requirements for reenlistment, so that a soldier has to prove his worth and his ability to get ahead during his first hitch in order to be accepted for another one. These steps already have had a tremendous effect on the overall quality of the Army, and their future impact will be even greater as we develop an Army of none but capable and ambitious young men.

In short, we feel that we are getting the finest young people in the Nation in the Army today.

The Honorable Gordon Gray, Secretary of the Army, before the Junior Chamber of Commerce, Winston-Salem, 20 January 1950